



FRIDAY, JUNE 12.

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Contributions.

The Proposed Adirondack Railroad.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The editorial note in your issue of May 29 on Dr. Webb's proposed Adirondack railroad has my hearty approval. My only criticism upon it is that it does not go quite far enough. What a nonsensical position the state has put itself into, in working all its departmental machinery to keep a needed railroad out of a so-called park which the state does not own! Would not any impartial observer question the disinterestedness of all who are urging New York State to stultify itself in that way? If we are to have a park let us have one owned by the state and run for the benefit of the people. The illogical position of state government is clearly brought out when we consider the fact that the Northern Adirondack and the Chateaugay railroads (about 70 miles each) have lines direct into this region, though not for their whole length. Nobody opposed these railroads when the proposal was made to build them into the sacred wilderness. On the contrary, the expenditure of money for such a purpose was looked upon as a public-spirited act, for the simple reason that no harm was done to the forests, but that real good was done to mankind in making the interior more accessible to invalids, sportsmen and tourists.

What is it now that Dr. Webb proposes to do? Simply to build a road through this wilderness, connecting the railroads running along its north and south borders. In other words, to extend the benefits of the existing short interior roads to the public at large. This of itself would seem to be a project worthy of praise rather than blame.

But if our proposed Adirondack Park is to be a park at all, we must not allow it to be destroyed by the building of many railroads through it. A few more roads there will drive away the wild animals and destroy the grandeur and solemnity of the forest primeval. A few words on this objection may not be amiss. In the first place, if we are to have a park, for whom are we to guard and keep it? If the theory is that the state is to own such a vast wilderness for the benefit of rich sportsmen alone, let the fact be publicly stated. I sympathize with the rod and gun men who every year spend large sums so that they may have their pleasure in so grand a preserve, but truth compels me to say that no such theory can ever be accepted in this country. State money can only be expended for the benefit of the people at large—the common people. But how are the masses to enjoy this grand park, supposing it to be purchased by the state? Only by making it accessible; and this is exactly what Dr. Webb proposes to do. Of course, the thing may be overdone and more roads built through the wilderness than are necessary, thus destroying its character. But that is not the question now.

First of all, the state ought to buy the land for the park outright, and in a fashion to give it an honest right to control. Next, such roads—rail and wagon—ought to be built or allowed as would make the Park a possible pleasure ground to those who could get there. This plan of letting the Chateaugay road into the wilderness at its own sweet will and keeping the Webb road out, when both stand on exactly the same footing, is small business for a great state to be in.

Having thus freed my mind, I may be allowed to say that, on business grounds, I don't yet understand Dr. Webb's actions. I do not see how such a road is worth building, from a money point of view. The tourist and

charcoal traffic would not support it; neither would it make a good route to Montreal from New York City or from the West. No doubt the New York Central controls enough business to make up a respectable volume of traffic for an Adirondack route, but modern railroad managers know well that a badly located line is sure in the end to bring about its own punishment, no matter how strong the original backing. While I have no inside information I am strongly of the opinion that there is more behind this than has yet been made public. The New York Central is waking up out of a long sleep, and is casting about how it may fulfil its "manifest destiny" of being the master railroad of New York State. The Delaware & Hudson's railroads are valuable to the canal company as distributors of coal, but to the New York Central they would be still more valuable as merchandise feeders. Is the opposition to the Webb road engineered by the Delaware & Hudson people? And have we seen the beginning of a severe struggle between these strong corporations for control of northern New York? With peace between these two companies, I do not see why, from a business point of view, the Webb road need be built at all. ARGUS.

American and English Freight Cars.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your remarks on the tubular car frame you do not seem to give very great weight to the advantages claimed for long freight cars over the customary short English wagons.

You refer to the small average load of $2\frac{1}{2}$ tons per wagon, and ask how such a small load can be economically carried in 30-ton cars. If, however, we assume that of English freight as much as 90 per cent. consists of mineral, may it not very well be that such larger portion of the traffic could be better served by the long cars?

But, looking at the question from the point of view of one who pays freight charges, not now as a railroad man, I can most confidently say I should regret to see the day when 30-ton cars were used for every description of freight. I will give you two examples of carriage of freight. A few weeks since, from a station on the badly managed Southeastern line, I wanted delivered in London about a ton and a half of materials. We saw it loaded in the truck (wagon) on the Saturday, and it was not until Wednesday morning that Sir Edward Watkin's wretched management allowed us to have these things at London, a run of 20 miles only. This is usual with the Watkin line, by the way, and yet this man has the effrontery to ask the British people to intrust him with powers to make a tunnel to France. Now, how should we have been fixed had we had to wait for a whole 30-ton wagon to be filled up?

The same day that we received the stuff we sent it off by the London & Northwestern a similar but further distance out of London, but on a small branch line, and next day, within 23 hours to my knowledge, and how much earlier I did not inquire, the things were awaiting our order and were on the site of works in 30 minutes after I left instructions. Had the first line been as prompt we should have saved two days' wages of two men, which would have gone a long way toward wiping out a double freight charge for punctuality; and if the use of 30-ton cars had reduced our charge even 100 per cent., and we had had to wait for said cars to fill up to a paying load, would it have been an economy to us? As it was we had a truck to ourselves for less than a two-ton load, and it pays us to be charged accordingly.

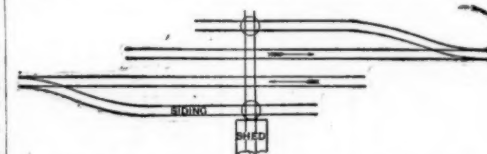
We all have our living to get and ourselves to advertise more or less, but when I see a man reading papers before different societies, etc., unfavorable to English railroads, and leading up to the conclusion that if English roads had American locomotives they would be O K, and when I find the same man so strongly supporting Mr. Jefferds, and contending that the trouble all lies with those confounded short wagons, I am puzzled. The English, between these two declarations of the same man, are in the position of the man who was told that a certain stove would save half his fuel. "Being me two, then, and I will save the lot," said he. Send us long cars and American locomotives, and there will be no need for any freight charges whatever.

As I am a rail user rather than an owner I feel certain that long cars won't do for our general traffic but ought to be adopted for mineral and coal traffic most decidedly. At the same time had I to push long-car interests with English managers I should try some other plan than telling them that they are a set of blind idiots and must be fools if they cannot see that it is to their interest to buy very long cars. Why, it is this very habit of us English that has done so much to keep up tariffs in America. Every intelligent American knows that high tariffs cannot be good for America, but its not in human nature to haul down the tariff flag because some one else calls you a fool for keeping it up. And so the railway managers will not buy long cars for kicking.

Mr. Jefferds' opponents say, "Oh! but your cars won't go on our turntables." And what does Mr. Jefferds reply? He says in America they don't use turntables, but this heaven-sent, bogie freight car will run round a circle of a radius of five-eighths of an inch, more or less, and can be turned end about on a loop. Now, who that knows anything of this little island can for a moment believe we have room in our big towns to put in loops to turn trucks end for end! In the first place, we have no room

to spare to put in loops; and if we had, we don't want them, for we have no special desire to turn our trucks end for end. [Nor have we in America.—EDITOR.] . . .

Now, I honestly believe Mr. Jefferds don't know what these stupid Englishmen use turntables for, so I will put it down here. Many English "goodsheds" are so placed, as in the diagram, that there may be sheds and sidings on



each side of the main line, but entirely without access by any possible system of switches. I was brought up in a town which had such a double goods yard and shed-ding, and the place was full of turntables, without which the trucks could not be placed on the transverse line which ran across from shed to shed and crossed the tracks of the main line too. When a freight came along she simply shunted off the stopping wagons into the siding, picked up the wagons ready loaded and went on north. The wagons were brought by horse, one by one, to the turntables and sent across to the various wharves, some unloading corn, others cotton, and so on. Had a 30-ft. car come along, I cannot now remember if there was any place convenient for unloading it, and it could not have been taken under a crane, because it would not have been able to go upon the turntables.

Now, it is all very well to tell a railway manager that turntables are not needed in England because they do without them in America, but it must be remembered that English railways were built in days before their future could be foreseen, and that they were unprovided with large station yards. . . . When it was perceived that a mistake had been made in not buying more land, the value of the bits wanted had been boomed up by the railway itself; and there we are. Americans who have long trucks to sell must study such points as this, and not forget that it is probably more than a thousand years since England had the same proportion of land to lay out yards on as now exists in America.

Let Mr. Jefferds go all he can for the coal traffic, but for my little lots of goods I can't use his long cars unless he is prepared to add considerably to my working plant and find me at least a thousand dollars a year for extra warehouse rent.

Even in the coal trade I would just point out that there would still be a large call for short trucks, it being a favorite plan with many country people and others to have a truck load direct for their own use. These people would not buy a 30-ft., tubular car-frame, double truck, American system, full load of 30 tons of coal. Please don't think me unfavorable to Mr. Jefferds. There is room for all he can make at his new works at Barrow.

ENGLISHMAN.

GAINES, WORCESTER, May 12, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I note Mr. Jefferds' letter in your issue of May 1. I would only reply very briefly.

A bogie car is simply two four-wheel bogies or wagons with a short wheel base, equal to the gauge of the road, say about 4 ft. 8½ in., and a long platform or body placed thereon. The European four-wheeled wagon carrying its own platform or body needs a wheel base of nearly double the gauge of road, say 8 ft. to 9 ft.

What is the best proportion of wheel base to gauge for steady running? On a crooked, badly laid road, and at slow speeds, the short base I take to be the best. On easy curves and well-laid road the longer wheel base should be the steadiest.

Settle the question of wheel base and weight of load per wheel, then I take it that the question of carrying the load on short or long platforms or bodies, the one on two four-wheel wagons carrying 15 tons each, and the other on two bogies or wagons carrying 30 tons on the two, is simply a question of commercial convenience.

But presuming that a wheel base of 8 ft. to 9 ft. is preferable from a running point of view, such a length of wheel base is not convenient in construction for bogies or wagons carrying long platforms or bodies, say the American type of freight car.

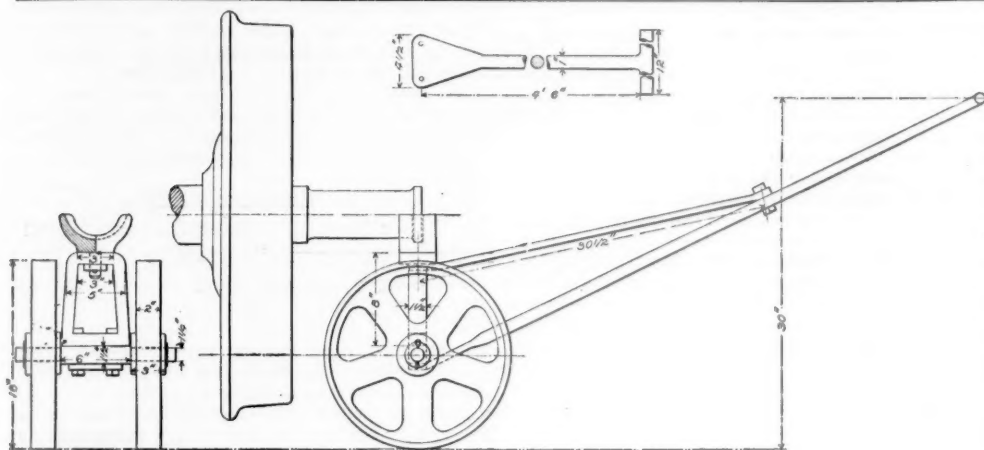
If I am right in my views it should be a better operation to carry 30 tons upon two four-wheeled wagons than 30 tons on long platforms or bodies supported on two bogies or wagons. As a matter of fact, in fast passenger coaches, run at high speeds, six-wheeled bogies are used, thus increasing the wheel base.

Again, it should be a more mechanical operation that the train of freight cars should be spring-buffed and articulated thereby at intervals of about 20 ft.

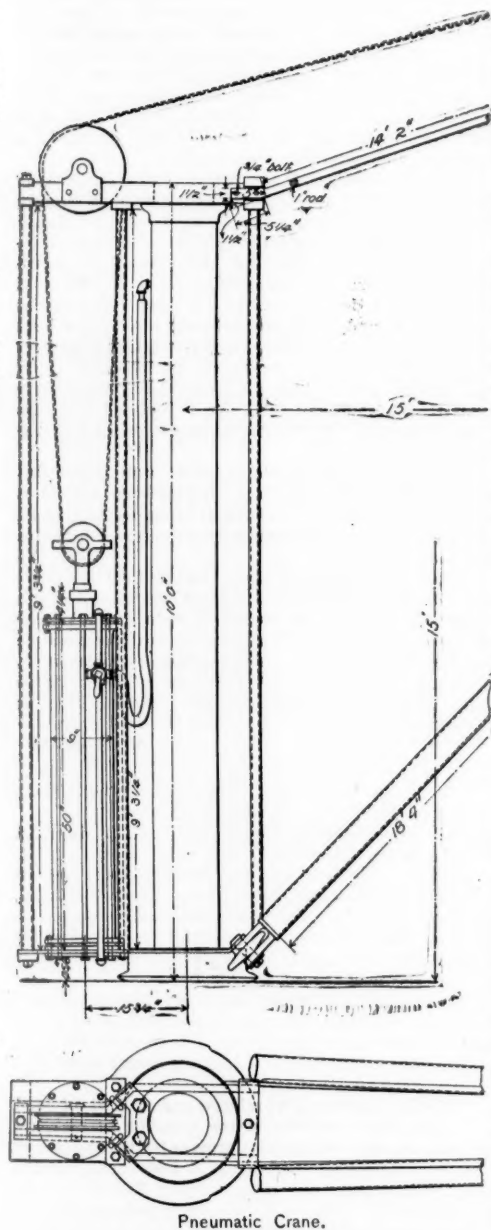
W. A. ADAMS.

Shop Notes at Indianapolis.

The shops of the Pittsburgh, Cincinnati, Chicago & St. Louis, at Indianapolis, located about a mile and a half from the Union Station, have far better surroundings for the health and comfort of the men than the average. The grounds are laid out with considerable taste, and the well kept lawns and shade trees are in pleasing contrast to the cinder yards about most railroad roundhouses



Wheel Truck—Indianapolis Shops.



Pneumatic Crane.

The shops at this point are in excellent condition for the class of work they are called on to do, and a number of devices for facilitating handling of material and keeping up the motive power are in use.

The application of air for lifting has been substituted for the usual form of hand hoist. Cranes in the smith shop operated by air are used for shifting the large plates and in the machine shop swinging air cylinders with hooks on the end of the piston rods prove a great convenience in many ways.

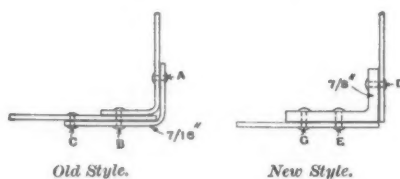
We give a sketch of a wheel crane recently erected which will interest our readers for several reasons. It illustrates what is sometimes accomplished at a small cost by a little ingenuity and a careful examination of the scrap heap. The main post is a cast-iron centre column discarded from under an old water tank. The two inclined struts are 4-in. flues taken from a scrapped stationary boiler. The small wheels at the foot run in a cast-iron block set into the end of the flue. The cylinder is a plain, cast-iron pipe, flanged at each end, and bored for an 8-in. piston, which latter was taken from an old 8-in. pump, the packing being that used on the ordinary Westinghouse pump. The three sheaves were picked up around the yard and the rods were furnished from a

discarded bridge, while the pedestal was made by boring out an old cast wheel, the column fitting down into it.

This particular pedestal has a history which may be interesting. It was made from an old, spoked, cast-iron wheel, with the hub divided into three segments, with lead strips between, and collars shrunk on on each side to prevent internal strains in casting, on the old theory that it was impossible to cast a good spoked wheel without some such allowance. This wheel was one of four on a truck that brought over the first locomotive which crossed the Alleghenies.

The crane is fastened with four $1\frac{1}{4}$ -in. bolts to a concrete bed. It has a lift of over 7 ft., and with 70 lbs. pressure of air will raise two wheels, the air being supplied through a 1-in. pipe from the reservoir in the boiler room. This crane stands out at the worn-wheel pile and has already effected a marked saving in the expense of loading and unloading wheels, as three men (one at the four-way cock, one on the ground and one in the car) will load very rapidly and not find it very hard work either.

These shops have just purchased an emery grinding machine for grinding guides and find that they can daily turn out about double the number of guides finished by the old method of planing. The emery wheel gives a very smooth, polished surface, requiring no after use of a file, as when a tool is used, and it will grind out hard spots which would dull and spoil a steel edge. The machine has a planer-type bed with an ordinary upper frame and head block, to which is attached a 10-in. emery wheel running at a speed of about 1,500 revolutions per minute and driven from a wooden cylinder or drum overhead. The head is moved across the bed by the usual ratchet arrangement, and the gears are so propor-



Old Style.

New Style.

tioned as to move the bed forward and back at equal speeds and very slowly.

A wheel truck, of which two were built here a short time since, from a design by Mr. Woodruff, the chief draughtsman, makes possible the partial employment of two men where formerly the entire time of three men was necessary for handling wheels (on the axles). It consists of a light truck on two 16-in., flat-tired, cast wheels, moved about by means of a long rod with a cross-arm handle at the end. A 30-in. brace rod extends back from the top of the frame, through which is swiveled the curved head. This head contains a groove $\frac{3}{8}$ in. deep and wide enough to accommodate the collar. The long handle is raised sufficiently to depress the head below this collar, when by lowering the handle the wheel is raised a few inches from the ground, and with a man and buggy at each end of the axle they can easily run the wheels around, which is certainly an improvement over the muscle testing plan generally followed.

The company is building Belpaire fireboxes on a number of its engines, putting a dome on the flat surface of the boiler top. In this matter of fitting the base of the dome to the boiler the practice has been changed somewhat. The ring now used is $\frac{3}{8}$ in. thick and outside the boiler sheet, whereas the old ring was $\frac{1}{8}$ in. thick and inside.

The old style has two rows of rivets, A and B, holding the dome to the boiler, while the new style has but one row, D. The new plan is the more expensive of the two, the ring being so much heavier, and the old style is stronger and would therefore seem better.

In the firebox they are putting five 2-in. tubes through the side sheets just above the flue on each side, and are drilling tell-tale holes in the alternate stay bolts, these being drilled in a small lathe (having a die clutch) before they are put into the boiler, and the upper stays being screwed in from the inside and done by piece work.

The baffle plates in a number of the engines have been

moved forward of the nozzles as an experiment, with the hope of showing an economy, but so far the expectations do not seem to be fulfilled, there being no perceptible change in the coal consumption. Furthermore the change permits the escape of a greater amount of cinders than formerly; and as the object of the extension end is to retain these, the position of any of the interior parts should be made with the idea of aiding this feature rather than otherwise.

The complete filling of the stack and obtaining more perfect vacuum as the exhaust rises, is secured by putting the bootleg inside of the straight barrel, using the latter simply for ornamental effect.

The Waddell-Entz Storage Battery.

A new storage battery has been lately brought out by Messrs. Waddell and Entz which apparently marks a long step in advance, and which is of great promise, both for motors and for lighting.

The Waddell-Entz storage battery is in principle the Desmazzures accumulator which was extensively used by the French government in various naval experiments. But the faults of the original battery have been so far overcome as to give promise of a practicable storage system in the near future. Leaving the technicalities to the electricians for discussion, we give a brief description of the apparatus.

Each cell of the battery consists of an iron box containing an alkaline zincate solution in which are immersed plates of very porous copper and sheets of perforated iron placed alternately. The copper plates are built up of cotton-covered wires which have a core of copper wire, surrounded by fine copper thread, braided and filled with copper dust, thus presenting a great oxidizing surface while retaining enough stiffness to prevent buckling. The wires of all the plates are united by a bar which forms one pole of the cell. Each copper plate is inclosed by a U-shaped sheet of perforated iron, the contiguous sheets being in contact, and those at each end having contact with the iron box which forms the opposite pole of the cell. One cell consisting of eight plates weighs 30 lbs. and any number of cells may be coupled in series to form a battery. In charging, the copper becomes oxidized and the zinc is deposited on the iron. In discharging, the oxygen and zinc are set free and return to the solution without loss, and it is observed that there is no escape of gas or tendency to buckle in the plates during either process, no matter how rapid it may be.

The electromotive force is from 0.8 to 0.9 volt, and each cell has a capacity of from $\frac{1}{2}$ to $\frac{3}{4}$ horse power, making the weight of battery about 55 lbs. or 60 lbs. per horse power. This is a great gain over previous types of storage battery.

At recent tests in Philadelphia a street car weighing two tons was fitted with one motor of the Waddell-Entz type and with 100 cells of this storage battery, the total weight of car being four tons. The car was run 40 miles with an average speed of 13 miles per hour, including stops, and a residue, sufficient to run the car an additional 14 miles, remained in the battery. It is said that the current is constant in power up to 80 or 90 per cent. of the capacity of the battery, depending upon the rapidity of discharge. The loss during idleness is stated to be about three per cent. for three months. For purposes of lighting street cars small cells are arranged to operate 16 candle-power incandescent lamps independently.

Governor for the Westinghouse Compound Engine.

The Westinghouse Machine Company has designed a governor for use with its high duty compound engine, engravings of which are shown.

Sectional views of the governor (see Figs. 2 and 3) show an absence of all the usual attachments of dash-pot, balanced eccentric, interlocking devices, etc. A heavy unbalanced eccentric and strap places the centre of gravity of the combination very near the centre of the shaft without sacrificing its strength. Short heavy springs with low initial tension are available in this form, and the governor is so compact, that it is placed in a heavy closed case which is completely filled with oil to insure certain and copious lubrication.

While the governor, as a whole, is very heavy and perfectly free to move, even through its whole range if necessary, its strength is a variable quantity and its leverage increases so as to meet and resist the greater strains of longer cut-offs. The governor utilizes its inertia for the necessarily rapid adjustment to meet instantaneous changes of load. The mere tendency of the engine to change its speed to the degree demanded by the regulation on account of change of load throws the governor to the new position to suit such new load, and the force that changes the adjustment of the governor is inertia. Other governors, as a rule, are actuated by changes of centrifugal force alone, and consequently require heavy fly-wheels, with attached mechanisms to keep them from racing under violent or sudden changes of load. Without these attachments the regulation is proportionately defective. In the new Westinghouse governor centrifugal force is merely auxiliary. It has neither time to act, nor is necessary for it to do so in order to accomplish the result desired.

A test was made on an 18 in. and 30 in. \times 16 in. Westinghouse engine with this form of governor at the station

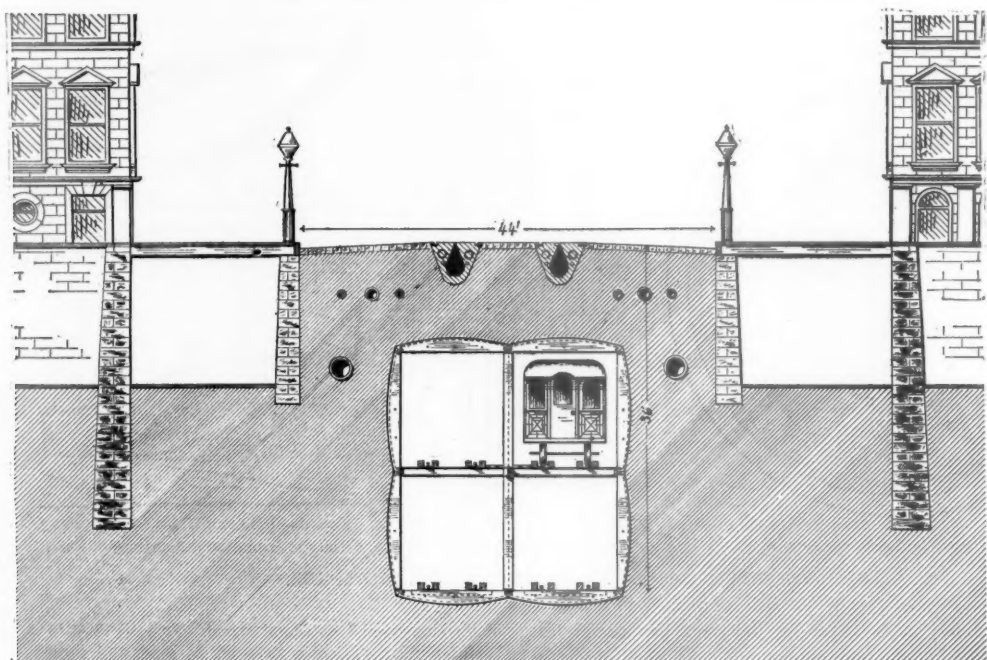


Fig. 1.—Iron Construction.

foundations of buildings, which would certainly be injuriously affected by the consequent vibrations.

The writer's scheme, consisting of separate pairs of straight-ahead tracks, eliminates all the above objections and complications, and admits of the following simple method of constructing the tunnel without disturbing pipes, electric subways and cable roads, which cannot be attained by the plan that involves four tracks on a level:

Method of Construction.

Beginning at about Grand street, it is proposed for lower Broadway to apply the cast-iron construction shown in fig. 1. In this the walls, roof and floor of the tunnel will be composed of cast-iron flanged girder panels, 2 ft. wide, set in place in the rear of an advancing shield, on the well-known principle of the hydraulic shield method of tunneling. With this difference, however, that the shield will have a rectangular periphery, instead of being circular, and will be reinforced by horizontal and vertical braces, while the cutting edges will be provided with indicator bars, to give notice of such obstructions as bowlders in advance of the shield.

The operation of driving this tunnel is as follows: The hydraulic shield, having been advanced a distance of 2 ft., the eight flanged girder panels composing the periphery of the tunnel are placed in position and bolted at their flanges; the horizontal and vertical I-beam girders being simultaneously erected, brace these parts at their points of common intersection. A grouting of liquid cement is then forced through holes provided for this purpose in the iron shell of the tunnel, which, on solidifying, fills up all space around the shell and protects the iron from corrosion. This grouting process has been successfully applied on the Croton Aqueduct and on tunnel work in England and Germany.

The horizontal girders above mentioned being but two feet apart may be used as a direct support for the rails of the pair of upper or local tracks. It is proposed, however, to interpose between the rails and these girders, felt or lead tieplates which will take up the sound of vibration. For a similar purpose it is proposed to make a continuous and smooth wall in the tunnel by filling in the space between the flanges of the girder panels with concrete and then plastering with cement. The ties of the lower or express tracks will be imbedded in a similar concrete filling between the flanges of the floor panels, thus giving the perfect roadbed essential to smooth running at high speeds. By the use of heavy rails and split joints (expansion and contraction in the tunnel will be almost nil) there will be no noise due to the pounding of the wheels at the rail joints.

The horizontal and vertical girders 2 ft. apart, which divide the tunnel into four trackways, make practically a single open tunnel which admits of one general system of ventilation for the whole, while there will be abundant clearance or air space for the passage of trains. This is very important where it is contemplated to run express trains at a speed of 40 miles per hour between stations.

For that part of the tunnel route above Grand street the writer proposes the following construction and method of driving (see fig. 5). A trench about 3 ft. in width and 38 ft. in depth is excavated outside of the street car tracks, the sides of the trench being securely supported by a heavy plank lining and cross braces. This trench is then filled in with the best concrete, the cross braces being removed as the filling proceeds, and when the concrete has reached the predetermined height of the tunnel wall it is leveled off, the lining of the trench above it removed, the trench filled in and the street paving relaid. The other side wall of the tunnel is then built in a similar manner. The plank lining on the inner sides

of the tunnel walls will be recovered in a subsequent operation. The construction of the walls of the tunnel in this way can be kept far in advance of the heading of the tunnel, so that the concrete will thoroughly set and season before being subjected to any pressure. The street surface need not be opened for excavating this trench for more than 400 ft. in length at a time, and this opening may be covered over with a temporary plank pavement, so that there will be little interference with the street traffic. The side walls having been previously constructed as above described, the ground between them is next excavated, and the roof of the tunnel supported in the following manner:

By reference to fig. 2 it will be seen that the apparatus consists essentially of a heavy girder resting at each end upon the completed side walls of the tunnel, and having attached a flat "roof shield" provided with a cutting edge and projecting "indicators." Distributed horizontally along the girder are a number of hydraulic jacks.

In starting a heading the method of procedure is as follows: A point of attack being selected, a pair of roof shields are placed in position, through an opening from the surface, with their cutting edges pointing in opposite directions. They are then forced apart by their respective hydraulic jacks a sufficient distance to admit of the insertion of the channel steel piece composing the roof of the tunnel. This operation is then repeated until a distance of 12 ft. has been excavated and roofed in, when two cast-iron columns are set up and the permanent girder, upon which the channel steel roof pieces rest in the

entre, is slid into position on top of them. In order to support the roof pieces until the cutting edge has advanced a sufficient distance to allow of the erection of another cast-iron column, two "working" girders are provided, which are fixed at one end in the girder shield while they slide upon the top of the last column erected. A space is provided as shown between these working girders for placing in position the permanent girder.

The ground adjacent to the steel roof will then be solidified by liquid cement or grouting forced in under pressure through holes provided for that purpose in the roof sections, and it is proposed to protect the roof from corrosion by previously coating the channel steel sections of which it is composed by the magnetic oxide process, after which they will be coated with asphalt.

The transverse I-beams supporting the upper pair of tracks will rest, at their outer ends, upon cast-iron pressure plates let into the concrete side walls, and fastened to these I-beams are bracket plates which will resist any external pressure upon the tunnel walls. The roof pieces are similarly provided at intervals with bracket plates as shown.

It may be found advisable to dispense with cross-ties for the upper tracks, in which case the rails would be laid directly upon the longitudinal track beams with an inch and a half thick hard wood strip between for cushioning. At all events a shallow steel crosstie could be used instead of the 8-in. thick wooden one shown in fig. 3, thus reducing the vertical dimension of the tunnel.

The method of building the side walls of the tunnel in trenches and then excavating the interior simultaneously with the construction of the steel roof, etc., is also applicable to points along the line where the whole section of the tunnel is in rock. In this case the inside plank lining of the concrete wall would protect it from injury in blasting. Of course the outside plank lining of the trench would be dispensed with, and the concrete follow the irregularities of the rock surface. The irregularities of the rock above the steel roof would be filled in by the cement grouting previously described.

The electric current for motive power, lighting and ventilating will be generated at two or three large power stations located along the Hudson River where real estate and fuel are cheap and water for condensing plentiful. In the tunnel the current for the motors will be supplied from main conductors supported by brackets on the centre columns, and at intervals of 1,000 ft. these electric mains will feed into the working conductors carried on insulators above the tops of the cars. These working conductors will be electrically welded into 1,000-ft. lengths, and attached to the insulators, which occur at intervals of 12 ft. along the line. The form of insulator proposed consists of a vulcanized hard wood rod 5 ft. long, attached as shown by means of cast iron sockets to the working conductor and to the tunnel. The return path for the electric current by this system will be through the rails and steel structure of the tunnel, thus applying the simplest possible method of electrical transmission.

In any underground system the subject of ventilation is of paramount importance, and it is the writer's opinion that with a tunnel of the magnitude of the one proposed for New York a sufficient supply of fresh air cannot be obtained by passing the trains through the

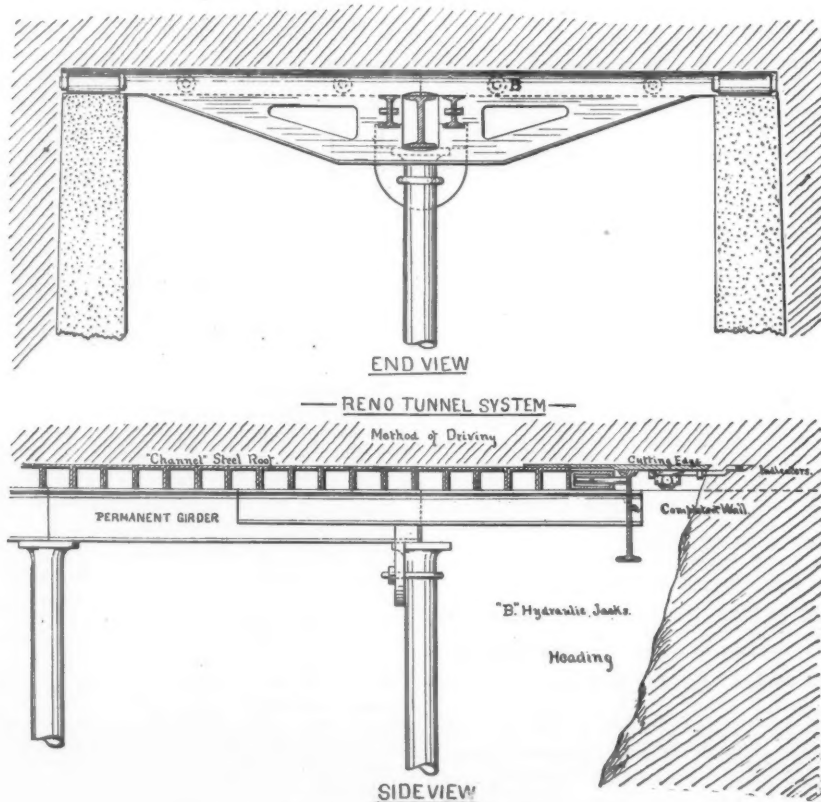


Fig. 2.—Details of Construction.

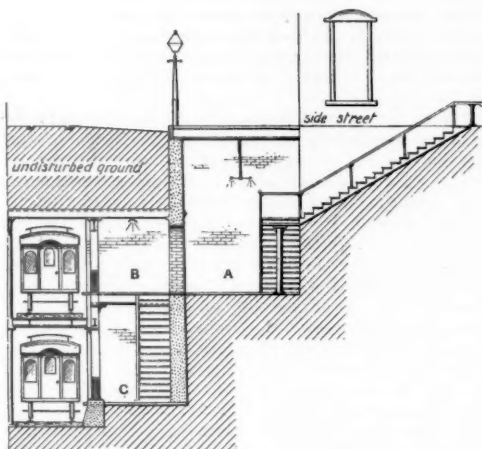


Fig. 3.—Half Section Showing Way and Express Station.
A, waiting room; B, way platform; C, express platform.

tunnel upon the principle of loose pistons, such as that applied to the London Subway. Besides the inefficient ventilation probable in this method, there would be an enormous air resistance, due to a train speed of 40 miles per hour.

As the whole interior of the tunnel designed by the writer is practically open, a single system of ventilation by forced draught will answer for all four tracks. Fig. 4 shows a section of the tunnel midway between stations, at which point a cast-iron tube 5 ft. in diameter is driven from the tunnel wall to the corner building, and thence carried up with an oblong section to a point 15 ft. above the pavement, where pure air may be obtained. This airway will rest against the wall of the corner building, and need not be unornamental. Near the tunnel end of the air-way would be fixed a 54 in. electric disc fan which will take its necessary electric current directly from the main conductors. The catalogue of a prominent manufacturer of these fans guarantees a delivery of 32,000 cu. ft. of air per minute from one of the above size, with an expenditure of 2 h. p. per hour, and as electricity is now produced in large stations at the rate of one cent per horse power per hour it, places the cost of thoroughly ventilating this tunnel at a very small figure. The air forced in at the airways will naturally take both directions along the tunnel and will find its way out at the stations. Allowing eight train loads of passengers at 500 each, or 4,000 as the greatest number possible at any one time in the tunnel between stations, with a supply of 4 cu. ft. of fresh air per minute to each passenger, we have the maximum supply of fresh air required as 20,000, while that forced in as above described is 32,000 cu. ft. per minute—certainly a safe margin.

The route laid out by the Commissioners necessitates a short viaduct at one point. This condition, however, presents no obstacle to the writer's scheme, as a double-decked viaduct has already been ably submitted to the Commissioners.

The writer has made a comparison of cost between the system invented by him and that with four tracks on a level, which shows a balance of at least \$300,000 per mile in favor of the former plan of construction. While it is undisputed that a rapid transit system along the route laid out by the Commissioners would pay a fair income on a very large capitalization, it is not to be supposed that a construction company will bid for the franchise at public auction, with an agreement to forfeit a very large sum of money in the event of non fulfillment, without first being thoroughly convinced and advised by a board of experts that the plan to be finally decided upon by the Commissioners is the one best adapted to all the conditions.

The Twenty-Fifth Annual Convention of the Master Car Builders' Association.

The Convention was called to order at the Stockton Hotel, Cape May, N. J., at 10:15 A. M., June 9, with 97 members present.

After a short address of welcome by the mayor of the city, President Kirby delivered an excellent address, from which we give extracts.

PRESIDENT'S ADDRESS.

The great diversity of design of the M. C. B. type of coupler coming into use since the vertical type of freight car coupler has been adopted as the standard of this association, engenders a great deal of trouble. . . . We have from twenty to twenty-five different patterns—and still increasing—all posing as standard couplers; and yet the knuckle—that portion of the coupler most likely to require renewing—is not interchangeable with any of the other designs. Then there are the uncoupling devices, differing each from the other, and as diverse as the couplers themselves. This multiplicity of design is tending in the wrong direction; and, in view of past experience, I venture to recommend that this convention, before adjourning, appoint a committee of five of its members to consider the best course to pursue in restricting the use of the M. C. B.

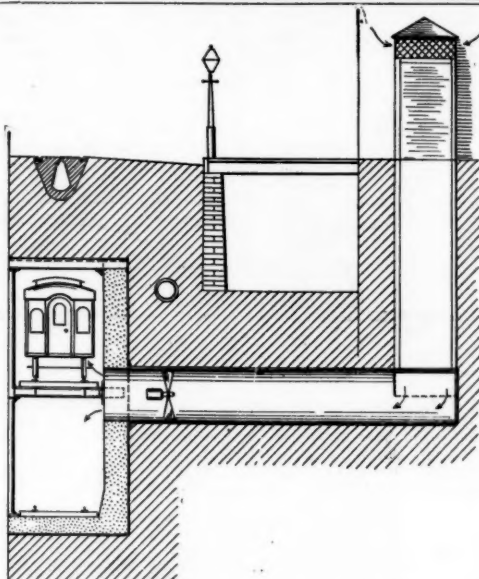


Fig. 4.—Half Section Showing Ventilator.

coupler to not more than five different kinds; and, also, to the end that the uncoupling device shall be as nearly uniform as possible. It is unnecessary for me to enlarge upon this subject, as you must all know, from everyday experience, the inconvenience caused by the difference in the construction of the many vertical types of coupler now extant. It has been said to me by parties who voted for the adoption of the vertical type of freight car coupler that they had two objects in view in so doing. One was additional safety to the men who make up and man the freight trains; the other was a great reduction in variety of drawbars now in use. Imagine the disappointment.

I desire to call your attention to the excessive use of the defect card by some roads. When it becomes necessary to utilize the space on two cards to enumerate the defects existing on one car it is time that the car was repaired. It is a common thing for the company which I represent to repair more than 400 cars in one month on cards, which would appear to indicate an abuse of the card system by somebody, and which has a tendency to encourage the loading of bad order cars for somebody else to repair.

I have been requested by the clerks in the car department of the L. S. & M. S. Ry. Co. to bring to the attention of this Convention the inconvenience experienced by the use of the old size of defect cards, how inconvenient they are to fold and file away. It is now about four years since the new and more convenient size (3½ x 8) of card was adopted, and yet some railroad companies are using the old-size cards to-day (4½ x 6 ins.). While on this subject of defect cards I desire to call your attention to the reprehensible practice of some inspectors of adding defects to the face side of a card which did not exist on the car when the card was first applied. This is nothing less than forgery, and if there is any man

within the sound of my voice this morning who has been guilty of this thing, I beg him to repent and resolve to do so no more.

The query presents itself to me: if it is not possible for nearly all of the matters pertaining to the interchange business to be settled by the parties interested, and thus obviate the necessity of calling the services of the Arbitration Committee into requisition. The Committee's work is becoming somewhat burdensome, and as I view it, unnecessarily so. During the past year they have given decisions on 48 cases which were submitted to arbitration. These decisions were based on the Rules of Interchange—which you all have in your possession. From personal observation of the questions decided by the Arbitration Committee during the last year it appears to me that nearly all of them should have been decided by the parties interested.

From observation and experience I feel safe in asserting that there never has been a time in the history of railroading when so much was expected of a man as at present; there is no standing still; it must be either progression or retrogression; but I have no fear of the latter so long as the young men of this association continue to put their shoulders to the wheel. We must, however, proceed with caution; and, in our zeal for making progress, we should not lose sight of the fact that every change made in car construction (and the desire of nearly every man is to have something different from his neighbor) increases the difficulty of making repairs; it frequently happens that crippled cars are held for three or four weeks at our shops awaiting the arrival of material which it was necessary to order from the owners of the cars. This would indicate that the term "M. C. B. Standard" was a misnomer. By way of example I beg to refer you to the Christie brake-head; while the adoption of that form of head was made with a view to simplify parts, I venture the assertion that, since the adoption of the Christie brake-head as the standard of this association, the difficulty of making repairs to freight cars has increased. While the shoes may be interchangeable, the brake-heads are far from being so; this is caused by the use of different beams, or a different manner of hanging. The same thing is true of the oil box for 60,000-lbs. capacity freight cars; the distance between centres of bolt holes varies by quarters from 8 to 9½ in. This is not progression.

It is gratifying to see the progress which is being made in equipping freight cars with automatic brakes and couplers; may the good work still go on.

The Secretary, Mr. Cloud, has improved upon ancient custom, and put each member in possession of reports of the committees two weeks in advance of the convention, thereby enabling the members to come prepared to intelligently enter into the discussions; this, I think, will be appreciated.

Almost upon the threshold of our annual convention day—on June 2—death has taken from our number one who has filled the offices of President, Vice-President and Treasurer, Mr. B. K. Verbyck. A committee should be appointed to prepare a suitable memoir of his life and work with us.

Gentlemen, I thank you for your kind attention, and I sincerely trust that the deliberations in which we are about to engage may be

"With wisdom fraught.

Not such as books, but such as practice taught."

The reports of the Secretary and the Treasurer were received. The changes in membership are as follows:

	1890	1891
Active members.....	106	108
Representative members.....	103	115
Associate members.....	5	5
	204	228

The Executive Committee in session Monday recom-

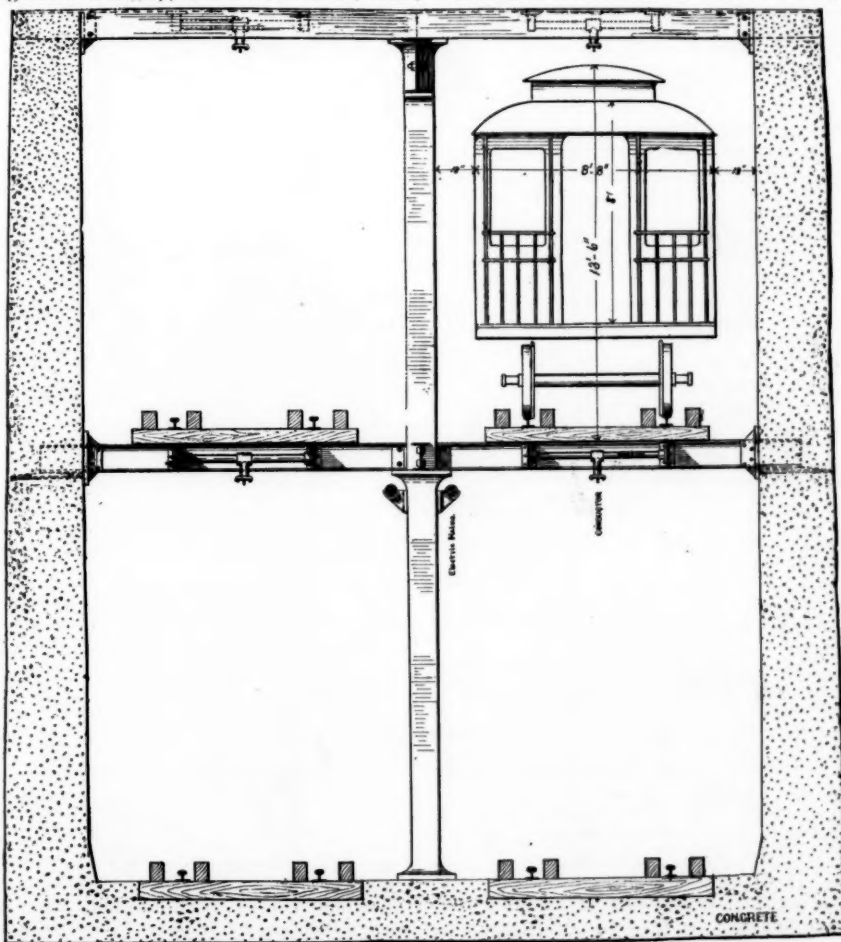


Fig. 5.—Concrete Construction.
RENO TUNNEL SYSTEM.

mended that the annual dues remain as they are now, and a recommendation to this effect was passed by the Convention.

After a recess of ten minutes to receive dues Mr. H. G. Prout and Mr. D. L. Barnes were elected Associate Members.

The President then appointed the following committees:

Nominating Committee: William Turreff, Rollin H. Wilbur, Benjamin Welch, William McWood and E. B. Wall.

Committee to Report Subjects to the Convention Thursday morning to be considered for 1892: F. D. Adams, E. Chamberlin, J. N. Barr, William Forsyth and John MacKenzie.

Committee on Correspondence and Resolutions: W. H. Day and Thomas Sutherland.

Auditing Committee: E. S. Bronner, E. S. Nelson and G. W. Rhodes.

REPORT OF JOINT COMMITTEE ON TIME AND PLACE OF MEETING.

This report was made by Mr. F. D. Adams. It was in effect that the joint committee recommended a change in the constitution or by-laws or both of each of the associations to arrange that the Master Car Builders' Association will meet on the second Wednesday in June, and the American Master Mechanics' Association will meet on the Monday following the second Wednesday in June. The following resolution was offered by the committees:

Resolved, that we, the committees appointed by our respective associations, recommend the change in the constitution or by-laws, or both, in each of the associations, so that the officers of each association constitute a committee of five to jointly fix the place of each annual meeting at least six months before the meeting, the committee of the Master Mechanics' Association to consist of the President, three Vice-Presidents and Secretary, the committee of the Master Car Builders' Association to consist of the President, three Vice-Presidents and Secretary.

Mr. Waitt moved that the recommendations of the committee be adopted and that the by-laws be so changed as to correspond with their recommendation.

After considerable discussion by Messrs. Adams, Waitt, Casanave, Schroyer, and others, the motion was adopted as presented, and the committee was discharged.

The Convention then took up the reports of committees.

The Chairman of the Committee on Metal for Brake-shoes asked to have the reading of his report postponed until he could make a few final preparations.

LETTERING FREIGHT CARS.

The report is accompanied with diagrams which we shall reproduce later. The recommendations being specific this report cannot well be condensed, and we therefore defer it to another issue.

STEAM HEATING AND VENTILATION.

This committee made a report which presented, in the language of a sophomore, a few time-honored propositions which no one will dispute. Apparently they farmed out the writing of the report to some unfledged journalist, for certainly the men whose names are signed to it are in the habit of expressing definite ideas in comprehensible English. They say that the direct steam "will doubtless be extensively used on account of being so cheap and easy of appliance, but we do not consider it well adapted to heating parlor or sleeping cars"; that the McElroy system "has been applied to many cars and run with considerable success," and that "there has been used with a good degree of success a number of the New York Safety Heating devices, which is by circulation of water heated by jackets, filled with steam, through which the water passes."

They mention further the Leland system, but do not profess to have ever heard of any other. They close with the following recommendations:

1. That all pipe, as far as possible, should be located inside the car.
2. That a uniform location should be adopted for the ends of the pipe between cars.
3. That a standard pipe union or corresponding device should be adopted for connecting the rubber hose with the train pipes.
4. That means for heating cars independently should be retained.

The report of the committee was received as read, and the committee continued. On motion of Mr. Townsend, seconded by Mr. Martin, the recommendations of the Committee were approved.

Mr. WAITT: I would move that the committee, being still in office, they be requested to present before the next convention a proposed standard for location of the end of the pipe and standard connection between the hose and pipe, which I think would be something we could adopt with advantage. The motion was seconded by Mr. West and carried.

The report of the Committee on Pressed Steel and Malleable Iron in Car Construction was next presented as follows:

PRESSED STEEL AND MALLEABLE IRON IN CAR CONSTRUCTION.

Pressed Steel.—Since our last report the use of pressed steel for car details has continued to increase, so that there is now about 15,000 tons of this material on cars in the United States.

In addition to the pieces already reported, pressed

steel shapes are now used for postpockets, side bearings, bolster guide bars, bolster guide blocks, stakes for gondola cars, corner bands, brakebeams, door hoods, etc.

In order to prevent too great a diversity of sizes of stake pockets, it is suggested that the sizes at the top should vary by $\frac{1}{8}$ in., thus: 3 in. \times $3\frac{1}{8}$ in., $3\frac{1}{8}$ in. \times 4 in., $3\frac{1}{8}$ in. \times $4\frac{1}{8}$ in., $3\frac{1}{8}$ in. \times 5 in., 4 in. \times 5 in., and that they have a uniform taper in each direction of $\frac{1}{8}$ in. in 6 in.

The centre-plate shown is the form which has been used most extensively. It is preferred by manufacturers



as the best form into which steel can be pressed, and experience with this form on 25,000 cars is very satisfactory. The larger annular rib resists most of the thrust on the plate, and prevents any shearing of the centre-pin. The bearing surface on the bolster is made as large as possible. Some pressed steel plates have been made with the bottom portion at the centre raised from the bolster, so that the load is carried in suspension. The constant movement of the steel plate under the variations of load has already produced rupture in a number of such plates. For this reason, forms, where the central portion has no bearing on the bolster (similar to fig. 6 in our report of last year, are not recommended. For cars of 60,000 lbs. capacity, pressed steel centre-plates should be at least $\frac{1}{8}$ in. thick. The centre-plate, fig. 1, is recommended as our standard form, so far as the bearing portion between centre-plates is concerned, leaving the width between flanges, height over all and bolt centres to be made to suit the bolsters on which they are used.

Pressed steel freight trucks are being gradually introduced in this country, and are now in service on a number of our roads.

The weight is somewhat less than the diamond truck for 30 ton cars, and it is furnished at the same cost. The strength of these trucks is greater than the heaviest diamond truck now made.

Malleable Iron.—A thin section being necessary to secure superior strength in malleable castings, it seemed evident that in a casting like the M. C. B. Coupler 1 in. and $1\frac{1}{8}$ in. thick in the arms and lugs, we would not get the advantage of the high strength and ductility usually attributed to malleable iron. This fact has such an important bearing upon the question whether malleable cast iron is the most economical material for the M. C. B. Coupler, that we have made some investigation of the strength of malleable castings of various thicknesses, from $\frac{1}{8}$ in. up to $1\frac{1}{8}$ in., increasing by eighths, and we present the results below.

The samples were obtained from the National Malleable Casting Company, Chicago, and were tested at the C. B. & Q. laboratory at Aurora. We believe the results here given are the first published tests of the strength of malleable cast iron.

TENSILE TESTS OF MALLEABLE CASTINGS.

C. B. & Q. R. R., AURORA, ILL., May 20, 1891.

Nominal Dimensions.	Actual Dimensions.	Area in square inches.	Tensile Strength.		Per cent. of Elongation in 4 in.	Elastic Limit.		Remarks.
			Actual.	Per sq. in.		Actual.	Per sq. in.	
$1\frac{1}{8}$ " \times $\frac{1}{8}$ "	1.52 " \times $.25$ "	.38	13,200	34,700	2	8,600	21,100	
$1\frac{1}{8}$ " \times $\frac{1}{4}$ "	1.52 " \times $.39$ "	.593	20,000	33,700	2	9,000	15,200	
$1\frac{1}{8}$ " \times $\frac{3}{8}$ "	1.52 " \times $.57$ "	.765	25,100	32,800	2	13,000	17,000	
$1\frac{1}{8}$ " \times $\frac{1}{2}$ "	1.53 " \times $.84$ "	.979	31,400	32,100	2	19,000	19,400	
$1\frac{1}{8}$ " \times $\frac{3}{4}$ "	1.53 " \times 1.12 "	1.35	39,100	25,100	$1\frac{1}{2}$	24,000	15,400	
$1\frac{1}{8}$ " \times 1 "	1.54 " \times $.88$ "	1.355	45,500	33,600	$1\frac{1}{2}$	26,000	19,200	
$1\frac{1}{8}$ " \times $1\frac{1}{8}$ "	1.66 " \times 1.02 "	1.08	33,000	30,600	1	19,000	17,600	
$1\frac{1}{8}$ " \times $1\frac{1}{4}$ "	1.28 " \times 1.3 "	1.664	45,600	27,400	1	....	....
$1\frac{1}{8}$ " \times $1\frac{1}{2}$ "	1.52 " \times 1.54 "	2.341	66,000	28,200	$1\frac{1}{2}$	....	....

While the results do not show any regular reduction of strength with increased thickness, yet it is plain that the average strength of the thin specimens is much greater than that of the thick ones. Thus the average strength of pieces $\frac{1}{8}$ in. thick, up to $\frac{1}{2}$ in. inclusive, 33,300 lbs., and of the thick pieces, $\frac{1}{2}$ in. up to $1\frac{1}{8}$ in. inclusive, only 28,980 lbs.—the thin specimens being 15 per cent. stronger than the thick ones. But the most important fact brought out by these tests is the low ductility of malleable cast iron, whether thick or thin. The specimens $\frac{1}{8}$ in. and $\frac{1}{4}$ in. thick had an elongation of only 2 per cent. in 4 in., and those 1 in. and $1\frac{1}{8}$ in. thick only 1 per cent. in 4 in.

We can now give the tensile resistance and ductility of malleable cast iron, as compared with that of other metals suitable for those details of cars which are subject to severe blows. Current specifications for wrought iron require a strength of 50,000 lbs. and an elongation of 20 per cent. in 4 in. For good cast iron 20,000 lbs. For steel castings, 60,000 lbs. and 10 per cent. elongation in 4 in.

COMPARATIVE TENSILE RESISTANCE AND DUCTILITY OF MALLEABLE CAST IRON AND OTHER METALS.

	Ultimate strength, lbs. per sq. in.	Strength rank with cast iron as unity.	Per cent. of elongation in 4 in.	Ductility rank with malleable iron as unity.
Cast iron.....	20,000	1	0.35	.....
Malleable cast iron.	32,000	1.6	2.00	1
Wrought iron.....	50,000	2.5	20.00	10
Steel casting.....	60,000	3	10.00	5

WILLIAM FORSYTH,
JOHN MACKENZIE,
E. D. BRONNER,
Committee.

Mr. BARR: The use of steel and wrought iron in car construction is an extremely important subject, and I think at the present time we are going through a transition period, where it is important to collate as much as possible the information and experience that the different roads are gaining in this matter. We all know that there are a great many peculiar points developed.

This Committee's report, for instance, shows that the strength of steel castings will rank as 3 as compared with wrought iron $2\frac{1}{2}$. It is the experience of a great many of the members of this Association that wrought iron is not as liable to break as steel. Of course, the ductility shows 10 to 5 in favor of wrought iron, which somewhat explains what would be an anomaly if we looked merely at the strength. I think there are going to be decided results in this matter, and I move that the Committee be continued, to report any further progress at the next meeting.

Mr. WALL: I move that we submit to letter ballot the recommendations of this report, and that when pressed steel is used the size and taper given for stake pockets on page 1 and the form of the centre plate shown in fig. 1 shall be considered as standard of this Association.

Mr. GRIEVES: I would like to inquire whether Mr. Forsyth made any test as to this form of centre plate?

Mr. FORSYTH: I did not; but this form of centre plate was tested when the first steel centre plates were used, and as a result of the tests there were put into service several thousand of the plates, and Mr. Paxson's (Reading Railroad) report stated that he was entirely satisfied. The manufacturers of the plate also say that the service of this form is so satisfactory that they have recommended it as the best shape.

The SECRETARY: I have a tracing which I received from Mr. Forsyth, the chairman of this Committee, too late to have a cut made, and it is exactly like fig. 1 showing the centre plate, with one exception. In place of the dimensions of $3\frac{1}{8}$ shown it has 6 in. for bolsters of 9 in. or under; 6 in., the same measurement, for bolsters over 9 in.

Mr. BARR: I think we delay action by taking this step. We take these sizes for pressed steel stake pockets; at the same time we don't fix the size of the U bolts that are to hold them; there should be a complete drawing of it, showing the distance between the bolts that hold it to the sill. So also with the center plate; there are a great many roads now using wooden transoms, a great many using iron transoms and a great many widening their iron transoms. All this is extremely indefinite, and puts the question in such an indefinite way that I don't believe there are many of us who feel like voting at all, and if we did we would vote "no." But if we don't put these matters in proper form the result will be that the proposed standard will be lost and there will be a delay of another year.

The SECRETARY: If in this convention we should simply approve of the recommendations of committees, and there stop and not submit the parts to letter ballot, it would form a basis and guide for anybody to follow if they chose.

Mr. CHAMBERLIN: These innocent and harmless things sometimes grow exceedingly dangerous. I support the argument, that this be presented to letter ballot in some good form, accompanied by drawings.

Mr. GRIEVES: The sooner we get a standard centre plate the better. The reason I asked Mr. Forsyth in regard to this centre plate was that I am not quite sure as to its being the correct form to use, on account of the different widths of iron bolsters and because the centre plate must conform to the wooden bolster. It is going to be a very difficult matter to have a standard centre plate, and I believe with Mr. Barr that the centre plate should be accompanied by drawings, so we can know what we are voting on.

Mr. FORSYTH: The Secretary has already explained that there are drawings here in his hands. In regard to the stake pocket we thought it would be sufficient if we secured uniformity in the size of it without complicating it with dimensions as to bolt holes, because we thought any one who had adopted any particular form of bolt holes would oppose this movement.

Mr. CHAMBERLIN: Here is a patented device that Mr. Wall is making a recommendation upon. Is it his purpose to have this go before the Executive Committee in the usual way and pass through the usual channel?

Mr. WALL: It will have to, by the constitution of the Association.

Mr. WAITT: It seems to me that the general purpose of the Association in recommending standards has been to put something before the railroads of the country that will be of some advantage to the roads in interchange and repairs. I see but little advantage to be gained by submitting the recommendation of this report as stated. It is not so much the taper we want, because we do not do much "staking up" of foreign cars; but we do have occasion many times to replace stake pockets which have been broken or torn off from the cars, and for that reason it is very essential that the arrangement for fastening the stake pockets should go with the size of taper of the stake pockets before it is adopted as a standard.

Mr. WALL: The use of pressed steel has not advanced so far as to enable us to adopt standards, but the Committee in making their recommendations have, I believe, seen a number of different kinds of stake pockets, and they think it will be advantageous to have them vary in certain ways, so that ultimately, if we do adopt a standard, it will be something already in use.

The SECRETARY: The motion now is that the recommendations of the Committee in regard to the stake pockets be approved as the sense of this convention. Carried.

Mr. WAITT: In order to continue the subject and that we may have it in more definite shape for another year

to act upon as a standard, I move that a committee be appointed to take up the subject of stake pockets and report on a standard with attachments at our convention in 1892. This was amended by Mr. Grievies and passed as follows:

That a committee be appointed to report at the next convention, recommending a standard for stake pockets and method of attaching them to cars, and also recommending standards for centre plates, to show one for iron transom and one for wooden transom, and that drawings and models be presented with the report.

The convention then adjourned, to meet again Wednesday, at 10 a. m.

WEDNESDAY'S PROCEEDINGS.

A communication was received from the World's Columbian Exposition asking the co-operation of the Master Car Builders' Association, and a committee was appointed consisting of E. B. Wall, J. C. Barber and J. S. Lentz, to consider the communication and report to this Convention before adjournment.

The Secretary announced that a meeting of the representatives of the various roads over which the cars belonging to the Wagner Palace Car Co. round would be held in the reception-room at six o'clock p. m. for the purpose of revising rules adopted at previous meetings.

Mr. Kirby, the President, then resigned the chair to Mr. E. W. Grievies, first Vice-President.

The report of the Arbitration Committee was received and passed without reading. After some discussion, all the decisions of the Arbitration Committee were approved.

On motion of Mr. J. N. Barr it was voted that the rules of interchange be taken up separately and the recommendations of the Arbitration Committee be read and considered in connection with each rule. The changes up to adjournment are as below:

RULES OF INTERCHANGE AS AMENDED.

Rule 3, Section (a).—Shelled out; wheels with defective treads on account of pieces shelling out, leaving flat spots deepest at the edge, with a raised centre. Wheels must not be condemned from this cause unless the spots are over $\frac{3}{4}$ in., or are so numerous as to endanger the safety of the wheel.

Worn flange; flanges 1 in. thick or less, or having flat, vertical surfaces extending more than 1 in. from tread.

Rule 3, Section (s), Paragraph 11.—It was voted that the recommendation of the committee be adopted, which provides that "A new paragraph, No. 12, be inserted, and the succeeding paragraph numbered one higher; the new paragraph, No. 12, to read as follows:

"12. Brakeshoes $\frac{3}{4}$ in. thick or more at centre."

The discussion of the new clauses, 17 to 23 inclusive, was spirited and marked by expressions of opinion which showed clearly how intense the feeling is regarding air brakes and the repairs to same. The Western roads, as a rule, did not favor these additions, owing, as was stated, to the large cost for maintenance and inspection which would needlessly be imposed upon some roads, more particularly those who are not using the air brakes to a considerable extent. The changes were:

17. If the car has air brakes the cylinder must have been cleaned and the triple valve cleaned and oiled within 12 months, and the date of the last cleaning and oiling marked on the brake cylinder.

18. If the car has air brakes the cylinder must have been oiled within three months, and the date of the last oiling be marked on the cylinder.

19. If the car has air brakes the brakeshoe slack must be so adjusted that under the full application of the brakes the piston travels not less than $\frac{1}{4}$ in. nor more than 8 in.

20. If the car has air brakes the brakes must apply and release promptly with proper handling by the engineer's valve.

21. Triple valves and auxiliary reservoirs must be free from water.

22. Air pipes and all connections thereto must be free from leaks, and the pipes properly secured to the car body, so that injury shall not occur to the apparatus nor leaks be produced by shaking and vibration of the pipe.

Rule 3, Section (u).—This section was discussed at great length, and so much difference in opinion was made apparent and the discussion promised to be so long that the whole matter was laid on the table for the present.

Rule 3, Section (Y-1).—"Cars with doors missing; or in condition which will improperly protect the lading, or with door shoes worn or loose so as to allow the door to swing outwardly."

Sec. (y-2).—"Cars with four-hole centre plates and long centre pins through bolster must have two effective bolts diagonally opposite."

Sec. (y-3).—"Cars with four-hole centre plates and short centre pins which rest in upper plate must have three effective bolts."

Sec. (y-4).—"Cars with two-hole centre plates must have two bolts effective."

Sec. (y-5).—"Four-hole centre plates must not have two adjacent corners of plates broken through bolt holes."

Sec. (y-6).—"Two-hole centre plates must be unbroken."

Rule No. 4.—A car with defects which do not render it unsafe to run or unsafe to trainmen must be accepted, but in such cases the company to which the car is offered may require that a defect card shall be securely attached to the car with four tacks, preferably on the outside face of the intermediate sill between the cross-tie timbers."

Rule 5 was amended to read as follows in the last sentence: "The card must plainly specify in full each item for which charges are authorized."

Rule 7 was discussed at great length, more particularly after the introduction of the following motion by Mr. Waitt, of the Lake Shore. Owing to the lateness of the hour and the lack of harmony in opinions regarding this motion, it was referred to the Arbitration Committee, with a request to report on Thursday morning at 10 o'clock.

Mr. Waitt's Motion.—The following substitution for Rule 7: Defects for which owners are responsible:

- Roofs lost from cars on account of faulty construction or decayed condition.
- Locks and grain doors.
- Brakeshoes worn out.
- Journal bearings worn out.
- Pedestals cracked.
- Center plates or center plate bolts broken or missing.
- Column guides and column castings broken.
- Bolsters and spring planks broken.
- Body or truck truss rods broken.
- Draft bolster and journal box springs broken.
- Loose deadblocks.
- Loose sheathing on side of car.
- Loose tin or board roofs.

(n) Ends of cars bulged out.
(o) Cars low on trucks when wheels come in contact with body timbers.

(p) Running boards in bad order
(q) Such parts as fall under fair usage on account of ordinary wear and tear or bad or inferior design, material or workmanship.

Repairs for the above defects may be made by the railroad companies and shall be paid for by the owners unless the failure occurs when the car is wrecked. In case of roofs repaired the owners shall be notified immediately.

The Convention then adjourned until 10 o'clock Thursday morning.

Several reports which were submitted at later sessions follow. Others are held for a later issue.

AIR-BRAKE STANDARDS AND INSPECTION AND CARE OF AIR BRAKES ON FREIGHT CARS.

... In order to ascertain to what extent the standards heretofore adopted by the Master Car Builders' Association, referring to the application of the air brake to the freight equipment, were being used, and to ascertain if any alterations or changes in such already adopted standards were desirable, the committee sent out a circular letter of inquiry to the representatives of the different railroads, and the statistics obtained from the replies will be found tabulated.

It will be observed that since the adoption of the standards for freight-car brake gear two years ago, and up to about the 1st of March last, the roads mentioned in this table have applied the air brake, with substantially the apparatus adopted as standard by the Association, to 38,342 freight cars, and of these 38,342 freight cars 21,084 were also equipped with the metallic brake beam.

It will be seen that of those who consider that a wooden beam may be so constructed that it will give a satisfactory service a portion believe that it is more desirable to use a metallic beam.

Upon investigation, therefore, of the use which has been made of the existing standards, and in the absence of any criticism as to the effectiveness of the same, your committee finds no recommendation to make in reference to any alterations in existing standards.

In view, however, of such investigation as the committee has been able to make, and the very generally expressed sentiment that the most effective operation of the air brake can only be secured through the use of an iron brake beam, your committee would recommend and urge the application of an iron or metallic brake beam, conforming to the requirements already specified and adopted by this Association, in all cases where the air brake is applied.

In considering the question of interchange rules, as applied to the air-brake apparatus, it appeared very essential to your committee that a uniform system of inspection and care of brakes, as well as a uniform method of operating the same, should be adopted upon all roads. To secure this result your committee has prepared and presents to you herewith, to be issued in a form considered suitable for general distribution among employees, a code of rules to govern all employees of railroads who are concerned in any way with the operation, inspection or maintenance of the air-brake apparatus.

The adoption of rules of interchange of freight cars, applying to the air-brake apparatus, has been the subject of investigation, as thorough as possible, by your committee. It seems quite apparent that the time has arrived when some action must be taken by the Association in this important matter.

In offering the amendments below to the M. C. B. code of rules for interchange your committee has not recommended any particular method of testing the air-brake apparatus. There seem to be two methods by which such tests may be made, one being the use of a stationary plant at interchange points, consisting of air-pumping machinery, storage reservoirs, and a system of pipes throughout the yards, with local connections for the testing of cars at different points. The other method is the equipment of all locomotives used in switching with the air-brake apparatus, and the testing of the brakes upon cars by attaching the switching locomotive thereto. There are reasons to be given in favor of each method, and your committee does not feel warranted in undertaking to decide this question at the present time, although it would suggest that the use of switching engines for this purpose appears to be the most feasible.

Your committee believes that no charge to the owner of the car should be made for cleaning and oiling of the cylinder or triple valve or the keeping of the brake-shoe slack in adjustment any more than should be made for the oiling and care of journals upon axles, and it is recommended that the owner be only charged for the replacing of brakeshoes which have become worn beyond the limit specified in the rules.

In conclusion, your committee offers the following resolution:

Resolved, That the Master Car Builders' Code of Rules of Interchange be amended by the addition, as an appendix, of the following rule:

SECTION 1. In delivering freight cars equipped with air brakes at interchange points the air-brake apparatus must be in good working order, and any car may be rejected by the receiving road if the air-brake apparatus upon it is defective in any respect. To determine whether the air-brake apparatus is in good order, its operation must be tested under the full working air pressure of 70 lbs. per square inch, at the delivery point, by the delivering road, and under the supervision of or to the satisfaction of the inspector of the receiving road.

The conditions constituting good order shall be as follows:

(1) The cylinder must have been cleaned, and the triple valve cleaned and oiled within six months, and the date of the last cleaning and oiling marked upon the brake cylinder.

(2) The cylinder must have been oiled within three months, and the date of the last oiling be marked upon the cylinder.

(3) The brake-shoe slack must be so adjusted that under the full application of the brake the piston travels not less than $\frac{1}{4}$ in. nor more than 8 in.

(4) The brake must apply and release promptly with proper handling by the engineer's valve.

(5) The triple valve and auxiliary reservoir must be free from water.

(6) The air pipes and all connections thereto must be free from leaks, and the pipes properly secured to the car body, so that injury shall not occur to the apparatus car body nor leaks be produced by shaking and vibration of the pipe.

(7) The air-brake hose, when not coupled with that of another car, must be properly secured in the dummy coupling.

(8) The brake shoes must all be at least three-eighths inch thick at the centre.

(9) All parts of the brake rigging must be sound and efficient, and in accordance with Rule 3, Section 8, of the Master Car Builders' Code.

SECTION 2. A car having a defect in the brake apparatus may be received with a defect card for the same, provided that the defect may be of such a nature that it shall not interfere with the operation of the hand brake upon that car nor with the operation of the air brake upon any other car of the train.

JOHN S. LENTZ,
WM. TURREFF,
N. W. SAMPLE, } Committee.

WHEEL GUARANTEE.

The only material point of discrepancy between what appears to be the desire of the wheel manufacturers and

the provisions of the specifications for cast-iron car wheels adopted by the Master Car Builders' Association, is given in the second article of their resolutions, which reads as follows:

"That when wheels are taken out of service on account of sharp flanges, flat spots, comby or shelled-out treads, or for cracked brackets or plates, and it is found on breaking up the wheels that the depth and character of the chill and the strength and character of the metal in the plates are up to the standard specifications adopted by the Joint Conference Committee of the American Railway Master Mechanics, the Master Car Builders' and the Wheel Makers' Associations, it shall be considered that the failure is due to the service and not to the quality of the wheel, and that the wheel maker ought not to be called upon in such cases to pay for or replace any such wheels."

This proviso is in the first place indefinite, and in the second place would virtually put the wheel makers in position that they could under its provisions refuse to replace any wheels.

A. As to sharp flanges. A careful observation of this phenomenon shows that in ninety-nine cases out of a hundred one wheel has a sharp flange, while its mate-wheel on the same axle has a flange which is almost as good as the day it was placed in service, showing that there has been a tendency in the pair of wheels mentioned for the wheel with the sharp flange to run all the time against the rail. The causes of this tendency are as follows:

1. Wheels may vary in size on the same axle. 2. The trucks may be out of square. 3. One wheel may wear faster than the other, the fastest wearing wheel always running to the flange.

1. In our opinion misdating at the present day is a very rare occurrence.

2. As to the trucks being out of square, our observations would imply that this cause is not active in producing worn flanges, one pair of wheels very often having a very badly worn flange, while the other pair of wheels in the same truck shows no perceptible wear on the flange.

3. In our opinion the third cause, that is, the difference in the wearing qualities of the two wheels on the same axle, is the cause of nearly all flange wear, and for this cause the wheel makers should certainly be held responsible.

B. As to flat spots. We presume that the term "flat spots" does not include flat from sliding, as there is no question on that point, but that by the term "flat spots" is meant wheels having spots on them which have been worn through the chill or white iron. We cannot understand how, under any circumstances, the wheel maker should ask to be relieved from responsibility for this defect.

C. As to comby or shelled-out treads. These defects are entirely due to the quality of the wheel.

D. As to cracked brackets or plates. These defects are caused either by brittleness in the iron or by improper design of the pattern . . . and we do not feel that we could recommend that railroad companies should recede in any way from their rigid requirements in this respect.

It might possibly be fair to divide with wheel makers in the matter of sharp flanges, holding them responsible for one-half, the railroad being responsible for the other half, for wheels failing in this way, but it is our opinion that this really would be a more liberal allowance than justice could demand.

Committee, J. J. HENNESSEY,
THOMAS SUTHERLAND.

MAINTENANCE OF STANDARDS FOR COUPLERS OF THE M. C. B. TYPE.

At the last convention, held at Old Point Comfort, in June, 1890, the following motion prevailed:

"That the Executive Committee ascertain whether the M. C. B. type of coupler, now being furnished by the various manufacturers, conforms to the standards of the Association; that they submit a plan for the guidance of the Association in the maintenance of those standards, and that the Executive Committee be empowered to issue gauges, templates or special instructions for maintaining these standards prior to the next Convention, if they find it advisable to do so."

In pursuance of these instructions the Executive Committee appointed a sub-committee from among its membership, consisting of Messrs. Chamberlain, Barr and Grievies, to take up the details and ascertain whether the couplers now being furnished by the various manufacturers conform to the standards of the Association, and to propose a plan for the guidance of the Association in the maintenance of these standards. This sub-committee performed its duties and reported to the Executive Committee on May 7, 1891. The Executive Committee submits below the report of its sub-committee, as the report of the Executive Committee, as follows:

Your special committee appointed to ascertain whether the M. C. B. type of coupler, now being furnished by the several manufacturers, conforms to the standard of the Association, and to submit a plan for the guidance of the Association in the maintenance of these standards, would respectfully submit the following report and drawings:

On Oct. 1, 1890, the duties of your committee were made known to the several manufacturers of vertical plane couplers by circular letter and publication in mechanical papers, and manufacturers were requested to send to the chairman of the committee, at Buffalo, N. Y., a sample coupler and drawings of same.

In response to this request, the committee received the following [A list follows of 18 couplers received and of several communications describing couplers not sent]:

The results of examination of couplers submitted are set forth in cuts herewith, in which figs. 1 to 18 show the contour lines of the various couplers submitted, as determined by casts taken from the samples sent to this committee. In these cuts the standard contour lines as prescribed in the annual report of the M. C. B. Association of 1890 are shown in dotted lines. Fig. 19 shows all other measurements taken from the couplers submitted, in tabulated form as illustrated, in which tabulated form the standard measurements as prescribed by the Association are given for comparison.

For obvious reasons your committee would recommend that a maximum and minimum limit be established for the several parts of rough coupler castings.

The production of templates and gauges combining simplicity and efficiency for the determination and maintenance of standards has been somewhat perplexing, and your committee may not have devised the best forms of gauges, but they illustrate the points which need to be gauged, and it submits the gauges as shown and applied.

Fig. 20 shows minimum gauge or template for contour lines of coupler, and at designated points on gauge the variation, in figures, to be allowed from this minimum gauge for maximum measurements. Fig. 20 shows, also, in full lines, the proposed gauge in place; in dotted lines, the M. C. B. standard contour; in broken lines, the maximum variation to be allowed.

The Executive Committee did not find it expedient to issue any gauges or templates prior to this Convention, but it would recommend that the gauges mentioned and illustrated be used by the members of the Association to

ascertain whether couplers furnished them are near enough to the standard or not, and that proper limits of variation be adopted as the standard limits of the Association.

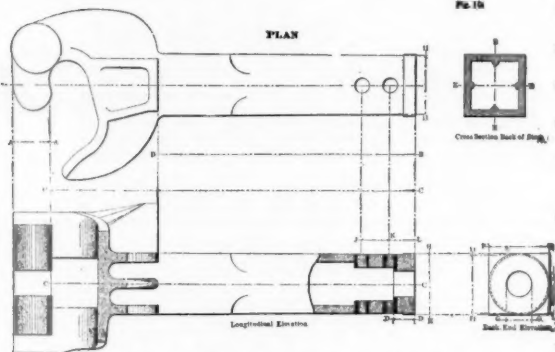


Fig. 19.—Variations from M. C. B. Standard Coupler.

NAME.	Distance between points.										
	AA	BB	CC	DD	EE	FF	GG	HH	II	JK	KL
M. C. B. Std.	3	2 1/4	30			5				2 1/2	2 1/2
Janney	3	2 1/4	30 1/4	1 3/4	3 3/4	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Gould	2 1/2	2 1/4	30 1/4	1 3/4	3 3/4	5	2 1/2	5 1/2	5	2 1/4	2 1/4
Dowling	3	2 1/4	30 1/4	1 3/4	3 3/4	5	2 1/2	5 1/2	5	2 1/4	2 1/4
Van Dorston	2 1/2	2 1/4	30 1/4	1 3/4	3 3/4	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Kling	3 1/2	2 1/4	30 1/4	1 3/4	3 3/4	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
California (Fox's Pat.)	2 1/2	2 1/4	30 1/4	2 1/2	3 1/2	15 1/2	2 1/2	4 1/2	5	2 1/4	2 1/4
Paragon	2 1/2	2 1/4	30 1/4	1 3/4	3 3/4	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Robert	3 1/2	2 1/4	30 1/4	2 1/2	3 1/2	5	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Eastwick	3 1/2	2 1/4	30 1/4	2 1/2	3 1/2	5	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Buckeye	2 1/2	2 1/4	30 1/4	1 3/4	3 3/4	5	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Trojan	3 1/2	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Thurmond	3	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Stiller	3	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Strosler	3	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Smillie	3	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Mather	3	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Hinson	3	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Union	3	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Barnes	3	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4
Gluck	2 1/2	2 1/4	30 1/4	2 1/2	3 1/2	5 1/2	2 1/2	5 1/2	5 1/2	2 1/4	2 1/4

† Key used in tail pin instead of head.

‡ Head of tail pin not passed through head of coupler.

§ Actual thickness of metal one inch.

|| Wrought iron shank (1 x 5 in. iron).

* Actual thickness of metal 1 1/4 inch.

§ Fitted with saddle for pocket.

** No holes for follower pocket.

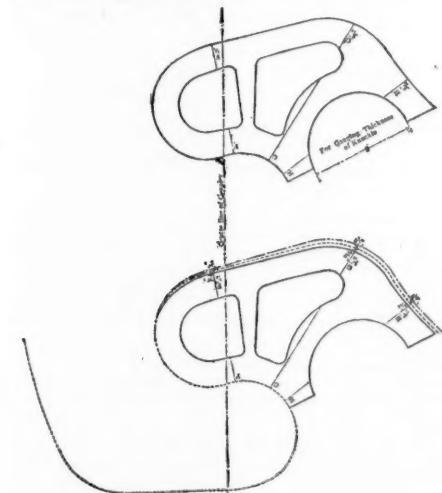


Fig. 20.—Proposed Contour Gauge for M. C. B. Coupler. Dotted line, standard contour; broken line, maximum variation.

EXHIBITS.

Among the exhibits at Cape May we note the following: Manning, Maxwell & Moore, New York agents for Pond Machine Tool Co., Plainfield, N. J. Catalogues and photographs of machine tools.

Ashcroft Manufacturing Co., Bridgeport, Ct. Tabor steam engine indicator and steam gauges.

Consolidated Safety Valve Co., Bridgeport, Ct. Richardson muffler and encased valves.

Litofuge Manufacturing Co., New York. Samples of boiler-cleaning compounds.

Peerless Rubber Manufacturing Co., New York. Mechanical rubber goods, air brake and tank hose, steam hose for car heating, fire and suction hose, piston and flange packing, gaskets and pump valves.

Martin Anti-Fire Car Heater Co., Dunkirk, N. Y. Steam coupler and Olin's temperature regulator.

Hartford Woven Wire Mattress Co., Hartford, Ct. Roberts patent woven wire car seats and back cushions. Seats complete in plush and rattan.

R. Dudgeon, New York. Crank pin wheel press, hydraulic jacks and punchers and Dudgeon's patent boiler tube expander.

Chalmers-Spence Co., New York. Asbestos boiler pipe coverings, hair felt for refrigerator cars.

Lucien Barnes, Sr., and Charles O. Barnes, Syracuse, N. Y. Number four full size Barnes coupler.

Knitted Mattress Co., Canton, Mass. Patented textile fabrics, quilted by a knitted process for stuffing car seats and backs, to take the place of curled hair. Also table-padding, stair-padding and mattresses of the same material.

Hale & Kilburn Manufacturing Co., Philadelphia, Pa. A large exhibit of car seats of their various patterns.

American Steel Wheel Co., New York. Full size 30-in. engine truck, spoke and solid double-plate wheels; 33-in. engine truck wheel; 36-in. car wheel; 42-in. driving wheel, elevated railroad pattern. Steel knuckles, with shavings from same, showing uniformity of material without blow holes.

Topping & Fox, New York. Samples of Wheeler's fibrous metallic packing.

Dreher Manufacturing Co., New York. Samples of Dreher's railroad car compound; car, cylinder and engine oil.

H. W. Johns Manufacturing Co., New York. Samples of asbestos pipe coverings.

Perfection Coupler Co., Springfield, O. Full size draw-bar vertical plane coupler.

R. M. Panoast, Camden, N. J.—Samples of car ventilators.

Weeks Automatic Car Coupling Co., Rondout, N. Y. Full size automatic link and pin coupler.

Hinson Drawbar Attachment Co., Chicago, Ill. Hinson drawbar attachment, Hinson friction buffer.

Haskell King Co., New Haven, Conn. King's patent car-window support.

A. C. Mather, Chicago, Ill. Full size vertical plane coupler.

United Railway Supplies Co., New York. Robert Eastwick vertical plane coupler, full size. Brown's metallic packing.

Thayer injector indicator, Henderson smoke-box protector.

Ford-Wentworth Car Coupler Co., Newark, N. J. Full size automatic link and pin coupler.

Wakefield Rattan Co., Boston, Mass. Henry's patent high-back tilting car seat in plush and low-back seat in rattan.

The Railroad Lighting & Manufacturing Co., Philadelphia, Pa. A special train composed of a Pullman sleeping car, a chair car and passenger car lighted by the Frost Dry Carbureter system.

Page Belting Co., Concord, N. H. Samples of belting and belt lacings.

A. O. Norton, Boston, Mass. Several samples of improved ball bearing lifting jacks.

Trojan Car Coupler Co., Troy, N. Y. A full size M. C. B. vertical plane coupler.

Union Coupler Co., Philadelphia, Pa. A full sized M. C. B. coupler.

Curley & Bailey, Troy, N. Y. Full size steam coupling, ball and socket joints, with attachments.

The Des Moines Patent Promoting & Manufacturing Co., Des Moines, Iowa. Full size Eden automatic ball coupler on model of car frame.

Universal Brakebeam Co., Chicago, Ill. Full size brake-beam, with heads, complete.

Field Feed-water Purifier Co., Chicago, Ill. Full size section of boiler shell about 10 ft. long, with feed-water purifier in position and connections made.

Eureka Coupler & Buffer Co., Minneapolis, Minn. Full size M. C. B. vertical plane coupler on model of car frame.

F. W. Bird & Son, East Walpole, Mass. Sample of "Neponsett" car roofing.

De Roberts Automatic Link & Pin Coupler Co., Omaha, Neb. Full size automatic link and pin coupler on model of car frame.

Damascus Bronze Co., Philadelphia, Pa. Sample of bronze castings and journal bearings in various forms.

Van Dorston Cushioned Car Coupling Equipment Co., Philadelphia, Pa. Full size vertical plane cushioned car coupler on model of car frame.

E. N. Gillfillan, Chicago, Ill. Complete line of car seats for parlor cars and coaches.

Chicago Grain Door Co., Chicago, Ill.—Full size model of car door.

The Thurmond Car Coupler Co., New York. One tender coupling, passenger car coupling and freight car coupling.

Wooden working models of car framing on which couplers are mounted. This company also exhibits a lateral motion device, which permits the coupler to take a considerable angle with the car on curves and returns them to the centre on a straight track in position for coupling.

McConway & Torley Co., Pittsburgh, Pa. Model of passenger car platform with passenger coupler and buffer springs; freight car coupling as ordinarily used, with interchangeable head for Janney and Miller coupler.

The Crosby Steam Gauge & Valve Co., Boston, have a fine exhibit of steam gauges, safety valves and mufflers; also, indicators and planimeters, whistles, test gauges and Bourdon tubes.

The Smillie Coupler Manufacturing Co., Newark, N. J., have a working model, full size, of the Smillie M. C. B. vertical plane coupler, showing the methods of attachment. The Smillie coupler has a double lock.

B. E. Tilden & Co., Cleveland, O. Model of Tilden's improved wrecking frogs and bridge guards, full size.

National Lock Washer Co., Newark, N. J. Samples of a variety of sizes of lock washers from 1/4 to 1/2 in.

C. B. Hutchins & Sons, Detroit, Mich. The Aldrich Perfection Spike. Full exhibit of spikes driven in solid oak, showing the action when driven in hard and soft woods and the reduction of injury to the wood brought about by the use of this spike. Kelsea card holder for freight car labels. Several full sized exhibits. Model of the Kelsea grain door.

American Brake Co., Westinghouse Air Brake Co., Lessee, Pittsburgh, Pa. Interesting model in metal, made one-fourth size, of a consolidation engine, completely fitted with the American steam air brake.

Gould Coupler Co., Buffalo, N. Y. Model of full sized freight and passenger car coupler, M. C. B. vertical plane type. The passenger coupler has shank.

Riehle Brothers, Philadelphia, Pa. Exhibit Robie patent screw jack and testing machinery. Full line of jacks exhibited.

Davis Spring Plate Co., Wilmington, Del. Large exhibit of spring plate for springs of various dimensions.

Boyd Brake Co., Baltimore, Md. This exhibit is, as it was last year, the largest on the grounds. An increase has been made over the exhibit of last year. It now consists of complete equipment for six freight cars and one Westinghouse equipment, air signal for 10 cars, full sized model of driver brake for consolidation engine, with flange, brake shoes, Ross-Meehan brake shoes. This apparatus is in full working order, with the complete engineer's valve and air pump.

Pencoyd Iron Works. A large exhibit of axles, both rough and turned, showing the character of the material and sec

* The lights have the Siemens burner and all the recent improvements. Full size drawings illustrate the construction.

tions of channels. One exhibit shows a steel axle, Master Car Builders' standard, 4 x 8 journal, bent cold until the ends touch without fracture at the point of greatest bending. Another exhibit shows an axle. No. 5. This is the other half, which with No. 4 formed an axle that was tested under drop weight of 1,640 pounds, falling 25 feet, striking the axle midway between supports 3 feet apart, and was given 28 blows without fracture. Axle was then split and bent cold No. 6. Steel axle selected from lot at random, placed on supports 3 ft. apart and pounded 32 blows all the way around by drop weight of 1,640 pounds, falling 25 ft. During the last few blows the axle was not turned, but weight was allowed to strike it in one spot. No. 8. Sample of round rolled steel as furnished to the Baldwin Locomotive Works for piston rods (bent cold). Specimen of angle iron closed and doubled together without showing fracture, and many other interesting exhibits of angle iron bent to conform with government requirements, showing remarkably good steel.

Lappin Brake Shoe Co., New York. Exhibit full sized shoes with flanges.

Norwood Car Replacer Co., Baltimore, Md. Exhibit of full sized car replacers.

Michigan Railway Supply Co., Detroit, Mich. Exhibit of full sized brakebeams of pressed steel, with heads complete.

Safety Car Heating & Lighting Co., New York. Exhibit full sized model, showing Gibbs steam coupling located below the air brake and signal hose; full sized model, showing new regulator system, with the regulator lever and cord.

Harless Flush Car Door, Anniston, Ala. Full sized model of car door, showing closed and grated door.

H. L. Leach, Boston. A sanding device for locomotives; full sized locomotive sand-box, with apparatus for furnishing sand to locomotive drivers, all complete and in operation.

Roberts Car Heating Co., Columbus, O. Model showing the arrangement of this system in a passenger car and full sized all-metallic couplings; sliding model showing the movement of the metallic coupling over all degrees of curvatures; reducing valve, automatic drip and temperature regulator. This system was illustrated in *Railroad Gazette* April 17, 1891.

L. Schutte & Co., Philadelphia. Large exhibit of the line of manufactures of this company, and one 9 and one 3-in. exhaust steam induction condenser, extra heavy, 8-in. globe valves; one free exhaust valve, one Watson & Miller steam trap, 1 in.; full line of Korting universal injectors from 1/4 in. to 3 in.; steam jet siphon pumps from 1/4 in. to 3 in.; blue print showing steam motors for locomotive turn-tables.

Erie Car Heating Co., Erie, Pa. Full sized model of metallic coupling; full sized model of apparatus for one car, including steam trap, gauges and admission valves.

Gold Car Heating Co., New York. Full sized apparatus for passenger cars, including the storage steam admission valves, traps and coil heaters. Two D. L. & W. passenger cars at the Cape May station, equipped with the return and the storage systems.

Morton Safety Heating Co., Baltimore, Md. Full sized floor and section of passenger car, with storage pipes, admission valves, traps and regulators. The storage system consists of 4-in. iron pipes covering earthenware tubes.

Schoen Manufacturing Co., Pittsburgh, Pa. Full line of pressed steel parts for freight cars, showing large varieties of pressed steel centre plates and stake pockets. Also pressed steel draft rigging. One of the novelties in this exhibit is the new pressed steel brakebeam and brakehead, of which two full sized models are shown, one for the M. C. B. Christy brake shoe, the other for the Collins shoe.

Standard Car Coupling Co., Troy, N. Y. Full sized M. C. B. vertical plane couplers and models showing this coupling with cast-steel and with forged-steel knuckles and forged-steel pins.

Butler Drawbar Attachment Co., Cleveland, O. Full sized model for tail bolt and strap.

Keegan & Halpin, New York. Wells light. Six lights in operation.

Buckeye Automatic Car Coupler. Full size d working model, of car with M. C. B. vertical plane coupler attached.

Detroit Lubricator Co. A handsome exhibit of the Detroit Lubricator, Garfield injector, locomotive guide cups, injector starting valves.

Fox Solid Pressed Steel Co., Joliet, Ill. New form of pressed steel freight car truck, with springs over axle boxes and car with pressed steel trucks which have been in use one year.

Northwestern Equipment Co., Chicago. One full sized brake-beam made from hollow rectangular pipe.

A. W. Van Dorston, Washington, D. C. Cushioned carrier iron to cushion bottom blows on couplers.

Stilger Strosler Automatic Car Coupler Co., Springfield, O. Full sized coupler on working model of car frames.

Drexel Car Coupler Co., Chicago. Full sized M. C. B. vertical plane coupler on working model of car frame.

Hinson Car Coupler Co., Chicago. Full sized M. C. B. vertical plane couplers on car frame models and friction buffer.

The Consolidated Car Heating Co., Albany, N. Y., has a large exhibit of its car heating devices and full working models of the several systems, as follows: Coil drum, disc drum, commingler and commingler storage. The exhibit includes full size steam heating couplings of the Sewall, Peerless and McElroy type. These models are all working under steam pressure, the steam being derived from a small locomotive boiler, 1/2 size, which is fired with gas. There are full sized fittings with all parts and a novel temperature regulator for passenger cars. This is one of the largest exhibits at the convention.

John R. Goodwin, 29 Broadway, New York. Full-size model of the Wood platform car gate.

Scarritt Furniture Co., St. Louis, Mo. Complete line of their various patterns of car seats and chairs.

Moore Car Door Co., Chicago, Ill. Model of the Moore car door and hanger.

E. N. Jones, St. John, N. B. Full size automatic link-and-pin coupler.

Schuttler Manufacturing Co., Chicago. Full-size ratchet drill.

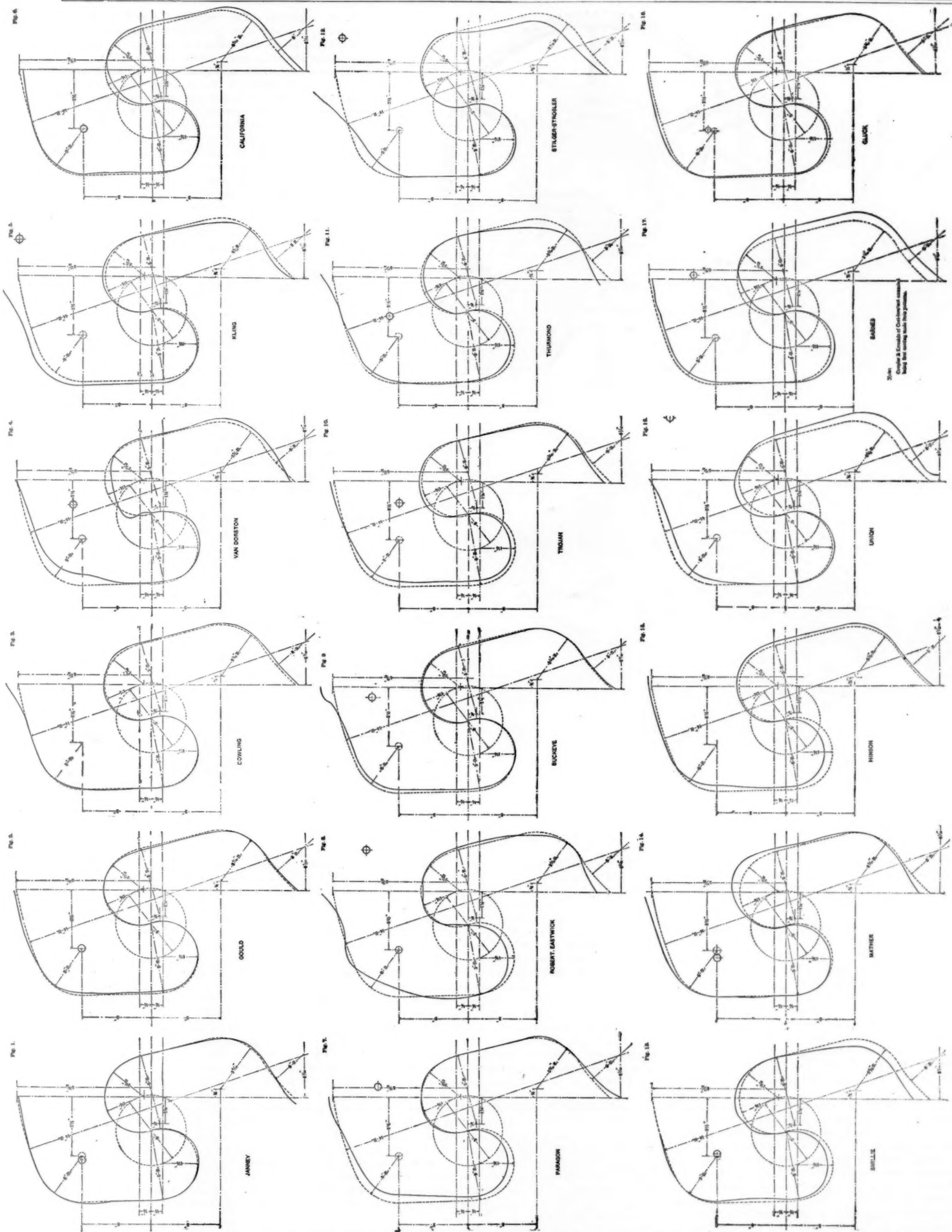
Geo. H. Poor, Chicago. Full-size model of the Boyer speed recorder in working order.

J. B. Graves, Cedar Rapids, Ia. Model of automatic double link-and-pin coupler.

The Richardson Automatic Coupler Co., Lake Village, N. H. Full-size automatic link-and-pin coupler.

Moran Flexible Steam Joint Co., Louisville, Ky. Flexible ball-joint steam coupler.

Standard Paint Co., New York. Samples of varnishes, wood



CONTOUR LINES OF 18 "M. C. B." COUPLERS COMPARED WITH THE STANDARD CONTOUR—WITH REPORT ON MAINTENANCE OF STANDARDS.

The Dotted Line is the Standard Contour.

preservative and the Giant "P. & B." building and insulating paper.

New York Car Wheel Works, Buffalo, N. Y. A 42-inch balanced machined car wheel.

Ross Valve Co., Troy, N. Y. Reducing valve for car heating.

Electric Traction in London.

At the recent general meeting of the American Institute of Electrical Engineers Prof. George Forbes, of London, took part in the discussion of Mr. Sprague's paper on Electric Traction.

Mr. Sprague's paper was to the effect that the future rapid transit route would be in a tunnel; this principally for reasons of economy. He asserted that with an incentive given "before the first foot of road of the pro-

posed rapid transit route for New York is ready, a 200 horse power electric locomotive will be built, under guarantee to outwork any elevated road engine for speed, pulling capacity and steadiness of work, time of operation and continuous mileage. This statement is made from personal knowledge and with an individual willingness to assume the risk."

Prof. Forbes said that England was behind in the application of electricity in electric lighting, as well as for traction, but in the matter of real rapid transit the South London Railway is a step ahead of the United States—"not a step of considerable engineering magnitude, but a step of considerable magnitude in overcoming the inertia of the rest of the world; in leading capitalists, municipal authorities and the public generally to recognize that electric traction on a large scale is an accom-

plished problem. The development that has already proceeded since the completion of the South London Railway, bringing before Parliament the West Railway, crossing the underground railway system, which Mr. Sprague has alluded to, and the other electric railway down the length of Oxford street and Holborn many miles in length, is an indication that it has been realized by all those interested on the other side that this is an accomplished problem. . . . I will now say, however, a few words as to my own experience of the South London Railway. The system is working with absolute perfection at the present moment. At the beginning of its running there were some little troubles, chiefly mechanical. There were no electrical troubles connected with the railway after they once got the proper engine down to work. At first an

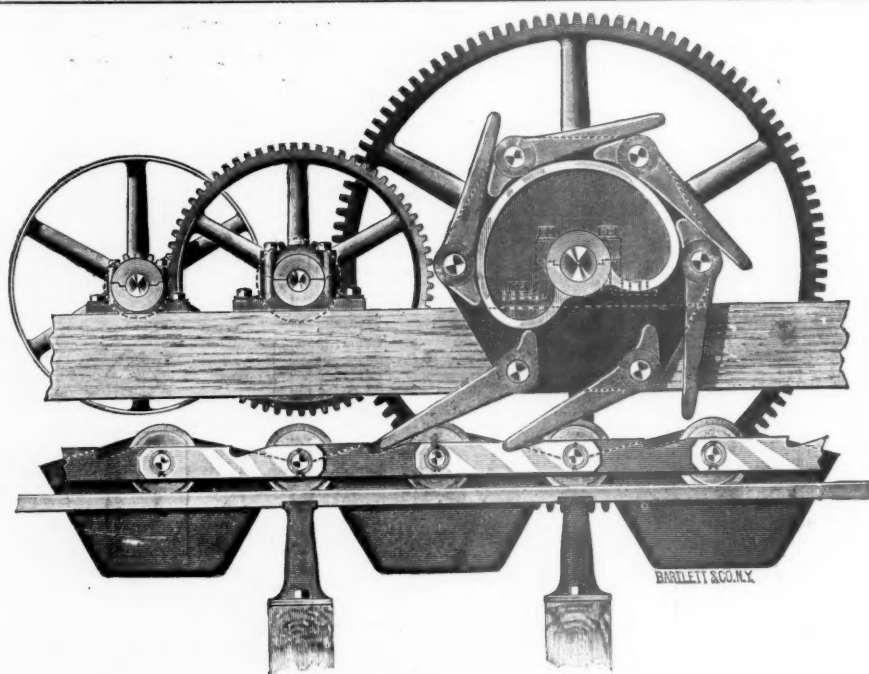


Fig. 1.



THE HUNT COAL CONVEYOR—Fig. 2.

engine not quite powerful enough for all they wished to accomplish was put down. But that was soon replaced by a more powerful one. The only troubles have been completely obviated and now its service is as perfect as could be wished.

"The comfort of traveling on this line is worth speaking about. . . . The comfort is perfect; the temperature is uniform, summer and winter. There are not the fumes that are in the old underground railway in London, and there is no vitiated atmosphere in any way whatever. The tunnel is air-tight and water-tight. No sewage could possibly filtrate into it. It is at a distance below all sewers and sewer contamination, and the ventilation secured by having two tunnels, the one for going and the other for returning, is absolutely perfect. The arrangements for large hydraulic elevators for carrying people to the surface of the ground are also perfect.

"The only point which strikes one as a little curious is that besides the electric system for propulsion and the hydraulic system for the elevators, we also have the compressed air system for the brake, bottles of compressed air being carried on the cars. It may be that an electric system of brakes might be harmonious with the other parts of the system. . . . The little noise there is not in the least objectionable.

"My own opinion is certainly in support of the view which Mr. Sprague has initiated, that the solution for rapid transit in New York is by deep tunneling and electric traction. As to the particular method of electric traction, I will not say anything about that at present. It is a mistake to suppose that there is only one system of electric traction which could be put on—that heavy locomotives pulling the train is the only way by which the problem could be solved."

The Hunt Coal Conveyor.

We present herewith detail illustrations showing a new style of conveyor for coaling and like purposes, introduced by the C. W. Hunt Co., of 45 Broadway, New York. Instead of using the usual sprocket wheels for effecting motion, pawls are used for pushing the chain along, a second pawl taking hold before its leader lets go. By such means a steadier and more even motion is

effected, with less wear upon the parts. By the use of the pawls and their operating mechanism the moving power can be applied at any straight line locality.

Referring to fig. 1, the action of the push pawls will be understood. A pocket is formed in each of the links of the endless chain, into which a pawl drops. Six or more of these pawls are attached to a revolving disc, and their movement to enter the link pockets is governed by a fixed cam, which turns them toward or allows them to quietly drop away, each from its own centre, as may be required for action. Instead of the pockets for the pawls, cross pins, as seen in fig. 2, may be used, the pawls grasping the cross pins instead of fitting into the pockets. The tracks upon which the wheels operate are supported upon timber framing and brackets, as shown in both figures. The car buckets can be made of any size, suitable to the kind and quantity of coal required.

The general method of construction and support of the buckets can be seen to best advantage in fig. 2. An axle extends across from track to track between each pair of buckets, while the buckets themselves are pivoted upon a wheel-supported bearing at each side. The links forming the endless connection are held together and in free operative connection at the several wheel centres or axles. A pin at the side of each bucket answers as a trip for emptying purposes.

Fig. 3 shows the general method of operation of the system. The upper enlarged view shows the (bucket) cars moving from a vertical to a horizontal track and discharging their contents. The lower portion shows in outline the whole belt or chain of movement. The cars in black having passed the filler, move upward and in a horizontal direction to the right until the destination is reached, when they are emptied, and pass along to a return and down to be filled again. The buckets are filled by either of two methods. For the smaller sizes of coal a revolving measure divided into two or more chambers delivers to each passing bucket its capacity of coal. For larger sizes of coal a continuous feed is kept up, the coal running through guides into the buckets as they pass.

The operative capacity is governed rather by the size of the buckets than by their speed of movement. The ordinary sizes made are 28-in. links and buckets of 2

cu. ft. capacity. The regulation speed of this size of conveyor is 15 buckets per minute, delivering 40 tons of coal per hour. The speed can, however, be increased to 25 buckets per minute and 66½ tons per hour.

These conveyors are now used by the Union Elevated R. R. Co. of Brooklyn, N. Y., at their East New York and 5th avenue coaling stations; at the coal docks foot of 20th street and 56th street, East River, New York City, also at the East New York station and the Milburn station of the Brooklyn Water-works. The specialty of these conveyors is for railroad coaling stations, where reliability of action and undoubted service are demanded.

Yale & Towne Pillar Crane.

The pillar crane shown in the engraving was designed by the Yale & Towne Manufacturing Co. for the Northern Central Railroad, at Baltimore, and may be taken as a general example of the pillar cranes made by that company. It consists of a cast-iron pillar with base, designed to oppose a uniform resistance to the stresses upon it, and mounted upon a foundation of depth and area proportioned to its capacity. The pillar is firmly anchored to the foundation by heavy bolts extending through to a foundation ring upon which the masonry is built.

The moving parts are all suspended to the top of the pillar on a yoke or cross-head, which is carried on a steel pin forced into the top of the pillar and fitting into a suitable bearing in the cross-head. Here provision is made for lubricating and to receive gear.

The boom is formed of a pair of rolled channel bars latticed together and its vertical pressure is carried entirely by two hanger rods connected to the cross-head. The horizontal thrust of the boom is received by thrust rollers which travel upon a bearing surface around the base of the pillar, while the outer end of the beam is connected to the cross-head by two tie-rods.

The winch, by which the hoisting is performed, con-

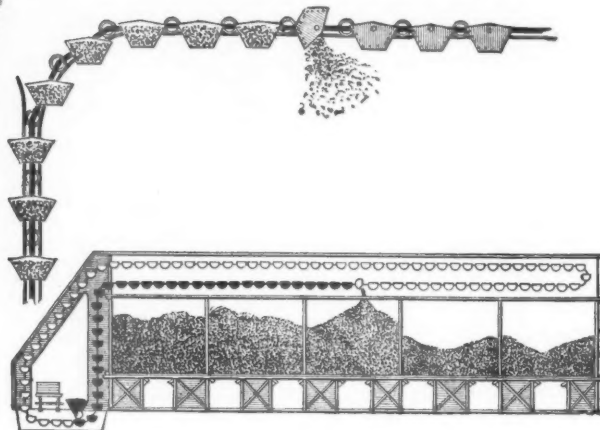


Fig. 3.

tains many valuable features. The chain, after having passed around the blocks, is wound on a grooved drum of large diameter, motion being given to the drum by a train of spur gearing operated by the hand cranks. Two changes of speed are obtained without shifting the cranks. The large diameter of the drum reduces the bending and wear of the chain to a minimum.

The construction of the winch is such as to secure safety and facility in handling light or heavy loads. Lowering is effected by turning the cranks backward, the load being sustained by the action of the Weston safety pinion, and the rapidity of the descent is under control at all times. When the motion of the handles is stopped the lowering ceases, and should the handles be suddenly let go their motion will stop at once, as it is impossible for them to fly back.

When the empty chain or light loads are to be lowered rapidly the "dispatch lowering device" may be used. This is operated by the hand wheel, shown just beneath the large spur gear wheel in the illustration, and by its use the load may be permitted to run down at any desired speed, remaining at all times under the entire control of the operator. Under these circumstances the hand cranks and gear train remain at rest, the drum, gear and pinion only being in motion, and dispatch lowering is thus safely and readily accomplished.

Fifty-Ninth Meeting of the American Institute of Mining Engineers.

This meeting was held at Cleveland, O., June 2. Although it was the very smallest meeting of the Institute your correspondent has ever attended, yet it did not seem to be lacking in interest. There were more ladies also, in proportion to the members, than is usual at such meetings, and this of itself added interest.

The first meeting was held in the Young Men's Christian Association building on Tuesday evening, and the Mayor rose (W. Y. Rose) and told us how glad he was to see us, officially and unofficially, and that the "Forest City" was equally happy. Then our President, Mr. John Birkentine, replied and said how delighted we were to be in Cleveland, and foreshadowed the good times we were to have there, which reminded one of the criticism made

on a new book, wherein the critic tells his friend the author that he has not yet read the work in question, but has no doubt it will prove all that a hasty glance at the preface promises. This is safe and sound, and our worthy President showed himself a man of genius and tact by the nature of his response.

This interchange of courtesies being completed to the mutual satisfaction of every one, the Convention was turned over to its proper head, and the audience listened to a most entertaining and instructive lecture, from Dr. Raymond, on Egypt. The Doctor deprecated the use of the term "lecture," but still it partook of the usual characteristics of a lecture, and was all the more enjoyable on that account. He illustrated his subject by photographic views. This completed the first day's session.

We were called together the next morning to hear a paper on "Electricity in Welding and Metal Working," by A. B. Wood, of Detroit, Mich. The author had samples of the results of the process, such as rods, chains, etc., which were carefully examined by the members. The process for rods, that of C. L. Coffin, differed from the old method in this respect: By the latter the circuit was used to bring the metal to a welding heat by means of its resistance to the passage of the current, the metal being in the circuit; the new process employs an electric arc, and the weld may not be in the circuit at all. He claimed a cleaner and more homogeneous weld. He was unable to go very much into detail, as the patents had not been entirely perfected, nor were the machines by which the process is effected described. On a bar 1 in. in diameter about 1 H. P. was used for 15 to 20 seconds. Other pieces shown require more power and time. He proposed to weld boiler tubes, plates or any other ordinary forging. The advantages claimed were rapidity, convenience in handling and economy of power required. The horse power was roughly stated as 1 H. P. per sq. in. of cross-section, and the time one minute or less. The skill of the operator was a factor in the case.

There was a little discussion, some favorable and other adverse. The ability to localize the heat was claimed, but it was questioned if this method could be applied to shafting of any size. The author claimed they would use for this a number of carbon electrodes and arrange them radially around the shaft. In the absence of data and detailed descriptions, which are to come later, the members, of necessity, regarded this matter as a sort of "faith cure." It will be a great success if it succeeds, and there the matter rests.

The next paper was read by its author, Prof. J. C. Smock, State Geologist of New Jersey, and was entitled "Iron Ores and Mining in New Jersey." He gave in this the history of the iron industry of that state for the past 170 years, and showed by a diagram the increase and decline of the trade, which singularly corresponded to the advance or decrease of the prices of pig iron in Philadelphia; although, naturally enough, with the usual deliberateness of the Quaker City, such advance or decline did not have its effect for two years. The number of iron mines opened in this period was stated to be 300, and of these about 30 are now being worked, most of the latter being the older mines. He stated that there had not been a new discovery of iron ore in New Jersey for 10 years. This shows either great foresight on the part of our ancestors or else a lack of knowledge on the part of their descendants.

"The First Blast Furnaces in America," by W. H. Adams, next occupied our attention. Virginia started this industry in 1619, and has kept up almost an unbroken line of successful charcoal-furnace practice since the Revolutionary War, the only missing link being the proof of the successful practice of the Spotsund furnace from 1714 to 1730. This link the author claimed to have discovered. He located the sites of the first and second furnaces at Rappahannock and Fredericksville, respectively, and found traces of the material brought from abroad for their construction. The first pig iron ever smelted in America was made here in a furnace where forced blast was used.

Jas. Gayley, of Braddock, Pa., contributed a paper on "The Development of American Blast Furnaces, with Special Reference to Large Yields," at a previous meeting, and a technical discussion on this ensued. Like many similar discussions, it was all "bosh." Each man had his own method, and each one knew it was better than any one else's.

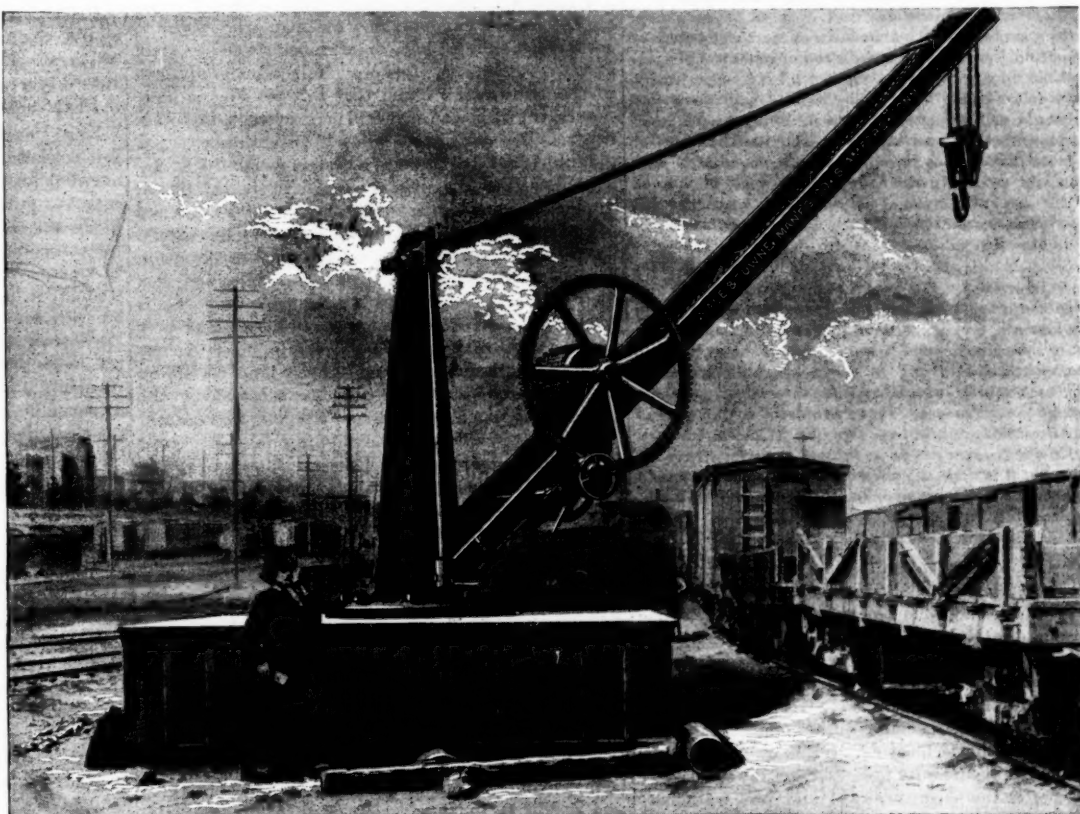
Mr. Gayley furnished a paper on "Blowing in Large Coke Furnaces." He claimed the furnace must be first carefully dried, and laid great stress on this, stating it should be continued for a month, beginning with a light fire and increasing. He cited instances from practice, of the evil effects of using a furnace not dried. This statement was confirmed by the experience of many others.

The discussion of blast furnaces occupied the evening, and various ones were reported on, as follows: The Emma furnace, Logan, Pa., which has averaged since June 12, 1890, 24.2 gross tons per day, with a maximum of 30 tons; the Hattie Ensley, Sheffield, Ala., which averaged for six months 146 tons (of 2,300 lbs.) per day, and the Antrim furnace, of Mancelona, Mich., with 93 tons per day. This was supplemented by other members. Mr. Fayette Brown reported on two furnaces, one 55 ft. high and one 60 ft., the oldest and smallest furnaces in the state. The small one runs from 100 to 110 tons daily and the large one from 110 to 138 tons.

Mr. Hugh Kennedy reported on the Isabella furnace No. 2, which made in 4 four years and 10 months 298,000 tons gross of mill iron. Mr. Johnson, of Longdale, Va.,

pipe. The results of Prof. Langley's experiments were that there was no general rise of temperature in molten steel from the addition of aluminum. The action of aluminum is 20 times as powerful as silicon, and the steel thus made is far superior in ductility and toughness and is freer from blow holes. This action is also chemical, and the aluminum readily decomposes carbonic oxide below steel melting heat, with the formation of alumina and free carbon. The addition of .05 to .1 per cent. of aluminum causes mild crucible steel to "pipe" freely, but in blown steel no such piping occurs.

He concluded that by adding .05 of aluminum to high class crucible steel, cast so as to avoid "piping," the use of manganese could be dispensed with, and thus an ideal iron and carbon steel be produced; that the neces-



PILLAR CRANE.

By the YALE & TOWNE MANUFACTURING COMPANY, Stamford, Conn.

was on hand and reported on two furnaces, one 14 and the other 16 ft. in diameter and 60 ft. high, which made 100 tons daily in the ratio of 40 tons to the smaller and 60 tons to the larger.

The Union gas furnace, of Detroit, made 30 to 33 tons daily, with an average of 87½ bushels of coal per ton. A few others reported, and the meeting became what in Methodist parlance might be termed an "experience meeting." This was certainly an improvement, for at one time it looked as though it might degenerate into a meeting like those of ancient fishermen, where each man outdoes his neighbor and the last man has always the call. The longest time any one reported a furnace banked was 13 months, and it was settled that increased capacity does not of necessity mean a relatively increased product in proportion. It was also conceded that better work could be obtained by the use of egg-sized coal, but this was offset by the increased price, so that larger coal was generally used. It was further asserted that blast furnaces should be compared by the amount of ore and flux per pound of fuel, and the amount of air used per pound of fuel burned.

Mr. Alex. Brown then presented a paper entitled "The Handling in Large Quantities of Ore and Fuel by Mechanical Means." He gave a detailed statement of the needs of machinery to handle the materials, and showed by photographs certain appliances. Before the use of these it took 12 hours to unload 500 tons of ore, and now the same number of men unload 1,000 tons in 10 hours. This machinery has been employed since 1883, when the ore trade to the lower lake ports was 1,692,000 tons; now (1890) it is over 7,000,000 tons.

The next day several papers were presented, and among them one by Prof. J. W. Langley on "Aluminum in Steel Ingots."

He stated that this metal produces a far better effect in quieting steel than ferro-silicon, and is being largely used for this purpose, especially since it leaves no portion of the quieting agent in the steel, from 5 to 7 oz. per ton being used where the metal contains less than .50 per cent. carbon; and over .50 per cent. carbon caution is necessary in its use, which should be in amount from 4 to 8 oz. per ton. The principal danger in using aluminum is excessive piping, and the best results are secured by using just enough of the quieting agent to allow the top of the ingot to rise a little and hence to leave a small

sity of "wash welding" could be avoided, and that 25 per cent. of the time and fuel could be saved in the operation of "drilling" and much wear to the crucible and furnace while a pure steel lower in silicon and manganese would be obtained.

"Geological Notes on the Manganese Ore Deposit of Crimora, Va.," was the title of a paper by Chas. E. Hull. In it he set forth the theory that these extensive deposits, the largest in the United States, are dissolved from the Potsdam sandstone and redeposited in the clay.

H. B. C. Nitze, of Baltimore (who is not so old as the second and third letters of his name would indicate), presented a paper on "Magnetites of Southwestern Virginia." This was in general a description of that part of the veins of Cranberry ore which is located in Virginia. There had been no real effort at development, but only a little desultory mining. The phosphorus runs below .01 and there is but little sulphur.

There were many other papers presented, either *in extenso* or by title, and lest any one should think the meeting was all science and no recreation, it may be said that the usual dinner, with the usual good time, came off on Thursday evening, and that the ladies were taken in charge by the hospitable Cleveland hostesses, and driven around the city and had a beautiful lunch at the Country Club.

Rights of Employers.

Good wages and reasonable hours are the just rights of all that work for others. But in order that wages may be paid, it is necessary that the employer shall direct the course of his business. The man who earns wages expects the grocer, the clothier and the butcher with whom he spends his money to supply him with what he orders, and not with what the tradesman prefers to sell; failure to deliver what is ordered, and at the time ordered for its delivery, would result in the transfer of the trade to some more obedient tradesman. He who pays money for anything expects to get what he wants in exchange for his money. This is just as true of him who pays money for labor as of him who pays money for clothes; the labor, like the clothes, must be of the sort demanded by the buyer. It is just as honorable to sell labor as to sell clothing; it is no more degrading to him who sells labor to make his labor conform to the demands of his customer, who is his employer, than it is to the merchant to make his wares conform to the demands of his customer, who is his employer also. It is desirable that the old-fashioned pride in the quality of a man's work should be revived. The old trade guilds nourished it; can the modern trades unions restore it?—*Chicago Inter-Ocean*.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The M. C. B. Convention may be considered a successful one this year. Several valuable reports have been presented and some necessary work has been done in revising the Rules of Interchange. Probably the most interesting and novel feature of this convention has been the enterprise of the Secretary in pushing forward the completion of the reports early enough to enable them to be in the hands of the members for about two weeks before the meeting. In this way each member has had an opportunity to digest carefully the subject matter before the papers are read and prepare whatever data for discussion that has seemed desirable. This plan was laid out last year, and has been carried out just as was intended. It has proved a success, and the innovation is one which is gratifying to all. The attendance was large and the location satisfactory. There has been the usual amount of complaint regarding the accommodations, but on the whole the same difficulties which exist this year have existed before, and can only be obviated by carefully laid plans and a full comprehension of the situation and appreciation of the large crowds which have to be cared for at these gatherings.

The brake-beam exhibit is much increased this year. In fact, more than doubled, there being five good metallic brake beams, all of which fall within the M. C. B. requirements. They are not, of course, all equally good, but in the main they are satisfactory.

The M. C. B. Committee's report on Malleable Iron and Pressed Steel for Car Construction contained data as to the strength and ductility of these materials which add to our knowledge of the subject, and show clearly the relative value of these materials and cast steel and wrought iron for parts subjected to blows and shocks. The attention of the Convention was directed by some members to the comparative value of malleable iron and cast steel for car couplers, as shown by this report. While the subject did not require that the committee should consider cast steel, yet they were justified in doing so, as that material is the only substitute yet offered for malleable iron used in car couplers. Pressed steel for couplers has been proposed, but as yet little has been done to show its value or the possibility of making a good coupler in this way. There was much discussion regarding the form of centre plate proposed, as to whether it had been proved to be the best. Evidently it had not, but favorable reports had been made of it. It would seem that the thickness of this material must be greater in the future for heavy cars if centre plates are to run for a long time without cracking. This report is of the type most needed, as it contains experimental data of a class that can be used for reference, and recommendations for standards that are extremely desirable and which will probably be adopted when definite drawings and models are presented next year. The encouragement offered this committee by the in-

terest shown by the members present is of a kind calculated to give them much interest in their work on this subject during the coming year.

The use of lap-sidings on the Cleveland & Pittsburgh road was described in the *Railroad Gazette* of December 26, 1890. The value of that arrangement of tracks had been mentioned in print before and is, indeed, obvious; but it is not so obvious as to lead to the construction of such tracks half so fast as it ought to, and we would suggest to division superintendents who wish to increase the efficiency of their forces, that Mr. Loree's figures, as given in the above-mentioned article, be copied in their notebooks, where they will not be lost sight of. Eighty-thousand-dollar appropriations are not got every month, and the man who wishes to get them at all must have his arguments well prepared, so as to convince his directors. He must not only realize the truth of his claim that by spending a large sum on tracks he can save still more in wages and other expenses, but must make himself an enthusiast upon the subject. To say that of a certain estimated saving one-half will be in wages, one-fourth in time of transit (freight) and one-fourth in diminution of wrecks and of delays to passenger trains, may be perfectly correct, but the statement is too vague to carry conviction unless it is backed up by examples and by a strong plea that is clearly recognized as coming from one who is dead in earnest. The last fourth is hard to present mathematically (though it has a vital influence on the profit account), and all the more stress must be laid on the other three fourths. Do not be deceived by the comparatively good work done with your present facilities or by the skill you are exhibiting in doing good work with poor appliances. One superintendent found that the Cleveland & Pittsburgh handled only two-thirds as many cars as he did with his ordinary meeting tracks, and at first concluded that perhaps the improved arrangements would be of doubtful economy; but a very little reflection showed that safety and celerity would be profitable on a road not worked to its full capacity as well as on one burdened with a rush of freight. We do not need to here point out the folly of waiting until business has actually increased so as to strain the facilities, before enlarging them; and the expenses for over-time and for losses by collisions are bad enough in quiet times. Another superintendent was asked by the directors to guarantee that there would be fewer collisions. If he would do that, the appropriation would be granted. He could show that the Cleveland & Pittsburgh spent \$80,000 and got back about 7 per cent. the first year (\$4,462 less expenditure on account of wrecks and \$1,013 less for over-time), but of course he could not prove a single item in the account. He might as fairly have been asked to prove that \$50,000 worth of new passenger cars would find passengers to fill them. The only way of dealing with such directors is to pursue an "educational campaign." Proceed to argue "from the known to the unknown," and see that more material for "known" factors is constantly furnished them. Furnish it in detail. Freight shipments obtained in consequence of a fast time record must be mentioned. The causes of loss of time by passenger trains should be as thoroughly explained to directors as to the general manager. It is not boys' play to put these details in a shape that will impress a financier who gives you his ear only one hour in a month, but it is a work that needs to be done.

Rapid Transit for New York.

The recent report of the Rapid Transit Commission of New York City has given a new impulse to the discussion of the exceedingly complicated problem of moving quickly and comfortably great numbers of people from one end to the other of the island. We do not propose to attempt here any exhaustive discussion of that report, but to state a few facts and opinions which may help a trifle to clear up the situation.

In the first place, the Commission has not recommended a deep tunnel for the lower part of the city or for any other part of the city. In assuming this, several editorial writers for the daily press have gone ahead from wrong premises. In the second place, the Commission has gone no further than is indicated in its report, viz.:

1. It has recommended a route from South Ferry, under Broadway to Fifty-ninth street; under the Boulevard to 109th street; under Eleventh avenue, or just west of it, to a point to be determined by the topography; by viaduct across Spuyten Duyvil Creek; by tunnel or viaduct to the city limits.

2. It recommends from South Ferry to Forty-second street a four-track tunnel "at such depth below the curb line as not to disturb the surface or endanger building foundations," and north of Forty-second street to be "as near the surface as practicable when in tunnel."

3. That the stations shall be on property acquired for that purpose, and provided with elevators for depths of 20 ft. or more.

4. That the motive power "shall be electricity or some other power not requiring combustion within the tunnel."

There the Commission rests until its engineers can collect the information necessary for further action. This information, it must be understood, is considerable, for upon the Commission devolves the duty of preparing in detail the plans and specifications on which the franchise will be sold. The franchise is to be sold at auction, but it need not be given to the lowest bidder, nor, in fact, need any one bid be accepted if the conditions and circumstances attached to it seem to warrant its rejection. The responsibility resting upon the Commission is great, as its powers are great. The necessity for proceeding only with due regard to a group of physical facts which are not yet in the possession of any man ought to be apparent.

It is a question if the franchise can be sold at all. It is not certain that, when the cost of the road is balanced against the probable revenue, capitalists can be found to put their money into the enterprise. Very likely this is what decided the commissioners to recommend a tunnel route. In many ways, if not in most ways, a masonry and steel viaduct, on an acquired right of way, through blocks or streets, at but a moderate height above the street level, would be better than a tunnel, but it would be immensely more costly. The only cheaper plan would be a viaduct in existing streets, or possibly a high bridge structure, giving 100 ft. in the clear above the street level.* We pretend to no knowledge of the reasons which decided the commissioners against both of these possibly cheaper plans, but there are many quite obvious ones. With their choice narrowed to a four-track viaduct on purchased or condemned property and a four-track tunnel, the great disparity in cost would have decided the question. We do not say that the tunnel solution is the best one. It is not the ideal one. If this could be undertaken as a great public work, by the city, a viaduct would be better, but that cannot be adequately and properly built by private capital. So we see how the decision was narrowed down to a tunnel.

But, as we have said, the Commission is not yet in possession of facts enough to go further. As to whether or not the tunnel shall be a deep or shallow one; what shall be its dimensions, shape and grades; how it shall be built and lined; how it shall be ventilated, lighted and drained,—all these are vital details to be settled when the ground has been explored. Whether or not the franchise can be sold to any responsible company will depend upon how the engineers of the Commission settle these details. A deep tunnel will be expensive to build because of quicksands, the difficulty of getting rid of water and the cost of raising and wasting the excavated material. The shallow tunnel will perhaps be even more expensive because provision must be made for safety of foundations, for handling a maze of pipes, and for future additions to those pipes.

Just at what depth the tunnel can be built at the least cost is to be decided only after study of facts, many of which are yet to be ascertained. But when the level of greatest economy of construction is found there will still remain the fact that a comparatively shallow tunnel will be more accessible, and we surmise that the recommendation will be for such a one. The assumption that the commissioners have recommended a deep tunnel rests upon the phrase "at such depth . . . as not to endanger building foundations." But this is relative. The danger to foundations where there is quicksand will extend to very considerable depths; where there is good ground or rock there will be no danger in a shallow tunnel. In short, this will be a matter of detail of the method of construction, and probably the commissioners will be guided by that rather than by any arbitrary consideration of depth.

We have gone so far on the assumption that the new rapid-transit road must be in a tunnel, and if it is to be built by private enterprise it probably must be, for the reasons given above; but let no one deceive himself by saying or believing that the problem of operating a rapid-transit road for New York in a tunnel is solved by the London experience with the City & South London subway. Some of the writers in the daily press have assumed that it is, and that opposition to the tunnel scheme comes from "prejudice or mercenary motives." The fact is that in the new London tunnel light trains of three small cars are hauled three miles, at the rate of 12 miles an hour, including four stops. It is claimed that the electric motors can make

* See Mr. W. Howard White, in the *Railroad Gazette*, April 24, for comparative estimates of these various schemes.

25 miles an hour with their trains. The trains are run at six-minute intervals; but this, of course, is an operating detail which has nothing to do with the efficiency of the motors.

The demands of the New York rapid transit route will call for a motor that can haul a five-car train of the weight of the present elevated trains at 40 miles an hour up one per cent. grades; that is, it must be seven or eight times as efficient as the London motors are claimed to be. No such motor has ever been built, and a few months ago none of the builders of electric locomotives were willing to guarantee, and put up a forfeit, to equip a road with machines of such capacity. We believe they had the opportunity. The confidence that the electric locomotives to handle the traffic of the future New York rapid-transit road will be built when they are needed rests on the very positive assertions of electrical engineers, and on a ready belief in the possibilities of electricity. It does not rest on actual performance in London or anywhere else. The City & South London machines are toys compared to what will be required here. Now we believe that, given the problem to haul 120 tons at 40 miles an hour up one per cent. grades, and given the assurance that a large number of electric locomotives capable of doing this work will be wanted three years from now, the electricians will produce the motor. It may not be a very economical machine, or it may be reasonably so, but it will probably be mechanically and commercially practicable. But those who doubt it and prefer to place their reputation or money on things that have actually been done have very respectable grounds for opposing the tunnel plan and insisting that the new rapid-transit route should be laid on surer even if more costly lines. It is foolish to impugn their motives.

Car Couplers at the Conventions.

At the Cape May Conventions the exhibits show the usual number of link and pin couplers. The only difference notable this year is that all are automatic, while in former years there have been more or less that were non-automatic. This class contains the usual number of absurdities.

The vertical plane couplers shown this year are a decided improvement over last year's exhibits. The standard contour is more nearly followed, and there is evidence of better material and workmanship. While there is a closer conformity to the standard lines than was shown last year, yet the exhibits are by no means in strict accordance therewith. Some of the couplers, made apparently from the same patterns, vary from each other to a greater extent than the proposed allowable variation will permit. But there is an evident willingness on the part of most manufacturers this year to conform strictly to the standard lines and to build within the limits of whatever gauges may be finally decided upon.

The improvements in general are not many, but they are valuable. Probably the most important is the change in location of the link pin hole in the end of the knuckle, made by moving it in toward the interior face about one-quarter of an inch. This gives a large increase in the thickness of the metal between the link pin and the outside face of the knuckle, and must to a considerable extent reduce the breakages caused by coupling with link and pin couplers. This is a class of breakage which represents about three-quarters of all failures of knuckles, and this increase in material to oppose the shocks induced by link slack will probably prove to be a decided advantage.

Another improvement noticeable in the majority of the couplers is a movement of the pivot pin away from the end of the coupler to a sufficient extent to allow a portion of the knuckle to pass outside the pivot pin lugs. This has two beneficial effects. It strengthens the knuckle considerably and serves as a protection to the malleable iron pivot lug. There is also a decided increase in the wearing area of the locks, and a much superior class of workmanship.

There is an increase in confidence in cast steel for couplers, as is evidenced by the fact that four manufacturers are offering cast steel couplers at the regular price per car, and all but one of the exhibits have cast-steel knuckles. There are several exhibits of good, sound steel knuckles, some of which, having been sawn in two, show absolutely no blow holes. The knuckles are of three kinds, cast steel, forged steel and wrought iron. The malleable iron knuckle has disappeared, as it should. Self-opening knuckles and those that may be opened from the side of the car are two of the prominent features of the coupler exhibit. It is however, hardly safe to say that all of these self-opening knuckles and opening devices are practicable. Most of them lack an essential feature which is necessary to insure durability in freight car couplers, namely, an

abundance of material. The parts are too small to withstand the rough usage they will meet; yet they all work satisfactorily in the exhibition tent.

The lifting devices and locking mechanisms for the vertical plane couplers are nearly all different, and there seems to be no possible way of making one device answer for all the different couplers. In view of the variations in the types of couplers exhibited a standard unlocking device seems well nigh impossible.

Probably owing to the discussion during the past year of the effect on couplers when they are used on cars of different lengths and on locomotive tenders, there are devices exhibited for overcoming the necessary differences in the lateral displacement of the ends of cars of different lengths on curves. These devices are of two sorts; one for the back of tenders has the form of a pivoted coupler head; another, for freight cars, has a spring on either side of the drawbar, which permits considerable lateral motion and yet returns the coupler to the centre on a straight track.

Profit-Sharing.

A well-known railroad manager proposes to increase the pay of his employees in proportion to the dividends earned for the stockholders, as will be seen by an article in another column of this paper. Moreover, we are told that this idea has long been in the minds of the management; and as the prosperity of the road in question is not unlikely to show marked improvement it will not do to hastily assume that propositions for profit-sharing on railroads always come from companies which have no profits to share.

We are glad to see this announcement, for there is no question that whatever discontent exists among the railroad employees of this country is based largely on the belief that wages are too rigidly fixed by the law of supply and demand, and never varied, except to be reduced by wholesale when business is dull. Even after making allowance for prejudice and ignorance, it must be admitted that this feeling has some justification by reason of the fact that reductions are likely to be made in the pay of a large number at once and to be much talked about, while advances are more likely to be made a few at a time and to be kept quiet. It will be a good thing if the variations in pay that are favorable to the employees can be made the subject of intelligent discussion among them. Although railroad directors are more enlightened than they were a few years ago concerning their duties to their employees, there are still enough of them who take short-sighted views, and those who are wiser ought to reap some benefit from putting their wisdom in practice.

At the same time we fear that paying employees a dividend on an assumed holding of stock will prove to be of only temporary benefit. This seems to be the lesson of the experiments of mercantile and manufacturing concerns that have tried profit-sharing. It offers very little to cure the evils of machine methods in disciplining men, and that is the worst evil in the management of railroad employees. The great need of railroad management in this respect is a closer relation between the manager and the workman. The desideratum here, as in all other business, is to pay dividends to the best men, who will return the amount in more efficient service, and to coincidentally show that the work of the other men does not deserve the same recompense; which implies, of course, that these men ought either to improve their abilities or resign. Profit-sharing has never done much in this respect. It is sometimes varied according to length of service, and is of course proportioned to salaries, but length of service is often an unjust criterion, as every one knows. A mere "horizontal" dividend paid to all, or nearly all, the employees is pretty sure to be too small to counteract the more powerful forces tending to influence the men in the opposite direction, and it will be hard to get directors to pay money where there is no tangible return at all except in the shape of sympathy. Results must in the long run be visible, at least partially, in improvement of service.

Mr. Parker's road (or any other) can doubtless make the best use of the profits it can spare by providing more careful, constant and thorough supervision of every man's work, by keeping a just and impartial record of every man's efficiency, and by readjusting the wages of those lower grades from which promotions are to be made, so that the best individuals among these shall with more certainty be kept in the service till they are wanted. We do not mean, of course, that only apprentices should be favored with a "raise." The more particular record of and acquaintance with the employees generally, will surely force variations in their pay, if the lessons learned are followed out; and, besides that, the more elaborate supervision will of itself absorb some little

money, unless the present discipline is better than on most roads. We need hardly add that we believe the use of money in this way would be profitable on most roads even if it has not been set apart as profit. Unless the public that uses a road is sadly in need of education, such expenditures (in the passenger department) will soon bring in profits, and they will be profitable in the freight department in any event.

The Differential on St. Paul.

The talk about the Canadian Pacific-West Shore freight line to St. Paul has among railroad men assumed an aggressive tone. The regular first-class rate from New York to St. Paul (via Chicago) is \$1.30. The old Ontario-Canadian Pacific line had a differential of 10 cents, or \$1.20. Commissioner Goddard, as arbitrator, fixed upon \$1.23 as the proper rate when the West Shore supplanted the Ontario. Nobody seems to be satisfied. The Canadian Pacific agent in New York is said to be still quoting \$1.07 (supposed to be made by adding a very low rate from the St. Lawrence River to the regular rate from New York to the St. Lawrence), at which figure it is said the rail line can get package business away from the boats on the lakes, as well as from the rail lines via Chicago. It is understood that the Canadian route, when working with the Ontario at a ten cent differential (first class), did not succeed in diverting from the Chicago lines any very large amount of traffic; since the proportion of westbound business carried by the Ontario, both via the Rome, Watertown & Ogdensburg and via Suspension Bridge, did not exceed one or two per cent. of the total. The West Shore is looked upon as a little better connection, but it is likely that \$1.23 as against \$1.30 via Chicago will not give the new combination any very great increase over the old Canadian Pacific proportion. The Delaware, Lackawanna & Western has taken advantage of the agitation of the differential question to demand one for itself over the Flint & Pere Marquette, across Lake Michigan and thence via the Green Bay & Winona road, which the Lackawanna is supposed to be affiliated with.

It is probable that the Canadian Pacific, in quoting the \$1.07 rate, is simply determined to carry the greater part of the New York-St. Paul business. Its argument, doubtless, would be similar to that attributed to President Hill, of the Northern Steamship and Eastern Minnesota line, that the Northern routes are entitled to the Northwestern traffic to and from the seaboard, and that the old roads via Chicago might as well say "Kismet," and let the Northern routes, lake or rail, take it.

The whole differential question as to St. Paul is an experiment. No one seems to have a clear idea of what effect certain reductions will have on the division of traffic. When this is known there will be the further question, just what percentage of this Northwestern traffic the Northern routes are entitled to. This is practically the same question that used to occasion so much wrangling in the old pool days. Nor is it easy to see what the Chicago roads can do about it. The Lackawanna tries to get an advantage out of the situation by dodging Chicago and asking for a differential because of a transfer across the lake. What reduction would be necessary to get any large amount of merchandise that way is wholly a matter of conjecture. But roads with a St. Paul route only via Chicago are differently situated. There is peace now between the Chicago-St. Paul roads, and those companies will scarcely be willing to disturb it by quoting a rate on through seaboard business much lower than their local. Then any trunk line, if it wishes to hold its St. Paul traffic, must cut its Chicago rate, not only on St. Paul business, but, to prevent innumerable other complications, on all shipments to and through Chicago. This would reduce its revenue far more than to lose St. Paul shipments altogether. Yet the traffic at stake is large enough to be worth fighting for, because it includes all that moves to the whole Northwest. Then, in summer at least, the lakes must not be forgotten, for a Canadian Pacific differential, if it did not allow of competition with the lake lines, would not be of much use to that company, even though the other rail lines were unanimous in granting it. The old story of the boy and the woodchuck applies here: as regards St. Paul traffic the Soo line is "out of meat."

Some traffic men are wondering why the strong Vanderbilt lines are willing to encourage a Canadian route over one of their roads. But the Central is not without good business grounds for its position. It can say: We are giving the Canadian Pacific only a small part of the traffic any way, a traffic which it claims to be entitled to as of right; nor are we quite sure that this claim has no foundation. Besides that, we keep that road out of northern New York State and save ourselves indirectly more than we lose. Then, too, in local favors, the friendship of such a strong system has many advantages. The roads that are objecting are those which would very likely lose this particular traffic any way. We made a mistake once in not letting the Canadian Pacific into Chicago over our Michigan Central and Canada Southern roads, when they asked for the connection, and we are not going to repeat the error in New York State.

Thus, possibly, the Vanderbilt argument might run. At any rate, the whole question of the effect of this or that differential is experimental, and will probably give rise to more or less controversy for some time to come. When more is known about its practical workings a

better judgment can be formed. At present no one can do better than decide these differentials according to Mr. Guilford's formula in unsolvable cases: split the difference so as to displease both sides.

"Soo" and Lake Traffic.

The officers of the Sault Ste. Marie Canal will soon publish the results of a discussion of the business of 1890. Advance sheets show the following figures for the last four years (the last column is corrected to 100 miles):

	Net freight tonnage.	Valuation of freight.	Average distance carried, miles.	Total cost of water transportation, \$100,000.	Cost per ton mile.
1887..	5,494,649	\$79,031,758	811.4	\$10,075,135	2.26
1888..	6,411,423	82,156,020	806.9	7,883,077	1.52
1889..	7,516,022	83,732,527	790.4	8,634,246	1.45
1890..	9,041,213	102,214,919	707.2	9,472,214	1.48

The average distance is 801.5 miles, as compared with an average railroad haul for the four years ending with 1889, on all the railroads of this country, of 110.63 miles, as returned in Poor's Manual.

The value per ton of merchandise for the above years and the percentage of the value required to pay the freight were as given below; but as the distance transported has decreased another column is added, showing the percentage for a uniform transportation of 800 miles:

	Value per ton.	Percentage of value paid for transportation.	Percentage paid for equal transportation.
1887..	\$11.39	12.75	12.6
1888..	12.81	9.59	9.6
1889..	11.14	10.31	10.8
1890..	10.30	9.26	11.5

As the total expenditures on the lakes under river and harbor bills above Niagara Falls up to the present time has been \$28,038,590, the saving at the "Soo" for last year seems to have returned about \$1.80 on every dollar expended on the upper lakes. It is noticeable that if this freight charge had been nine mills per ton mile the freight charges for the distance that merchandise was transported would have absorbed over 61 per cent. of its value, instead of about 9 1/4 per cent. It is not necessary to call attention to the fact that a great part of the tonnage passing through this canal would not have been produced if it had been obliged to pay so large a proportion of its value for transportation.

It follows, as a matter of course, that with such a large and prosperous business the appliances for conducting it should be constantly improving, and we find that during this time the value of the vessels passing through the canal has increased by about 50 per cent., and General Poe, the engineer officer in charge of the canal and the waterways of the lakes, says of these vessels, in urging government to appropriate about three and one-third million dollars for deepening the lake channels to 20 ft.: "These have increased in size and seaworthiness until they have a fleet which has not its equal upon any inland waters on the face of the globe. Of large capacity and great power, regardless of wind or weather the steamers of the prevailing type bear their cargoes to and from ports a thousand miles apart with the regularity and precision of railroad trains, each of them transporting at once more than ten ordinary freight trains." We may give an example of the efficiency of these boats: The steaming distance from Two Harbors on Lake Superior to Ashtabula on Lake Erie is 889 miles, and the round trip, including loading and unloading 2,300 gross tons of ore, is made in six days throughout the season. One of these steamers, the "Manola," the first to go into commission, during the 223 days of navigation ran 50,580 miles and delivered 77,125 tons of cargo. This record seems ahead of that of "El Sol," of the Morgan line, which is probably the best, as it is undoubtedly the handsomest, freighter sailing on salt water. The steaming distance from New York to New Orleans is 1,751 miles, and "El Sol" made a round trip, discharging and unloading in New Orleans, in 12 days 12 hours and 40 minutes.

Just now, with the lowest lake freight rates ever known, about two-thirds of the freight from Chicago toward the seaboard is carried by lake, and this state of affairs is likely to continue until iron ore once more moves freely.

The man who makes his first run over the East Tennessee, Virginia & Georgia, from Chattanooga to Bristol, will find several things to interest him. He will probably be surprised at the fine condition of the track and the beauty of the country. Generally, the line is through a good farming region, and in the end of May the fields of wheat and of clover and timothy were beautiful. The farm buildings, too, are of a better class than one expects to find in the South, although, of course, they cannot compare with what he may see in eastern Pennsylvania and central New York. Even in the most mountainous parts there is a considerable cultivation; and the occasional glimpses of the distant blue peaks of the Cumberland Mountains on one hand and the Great Smoky Mountains on the other give an additional charm to the scenery. The track is stone ballasted, the ditches are clean, the rails and ties generally in good condition. One notices several instances of unusual care. One is the use of clearance posts at all switches. These are low enough not to be in the way, but conspicuous enough to mark the fouling points. Another detail not often seen is the indication of all yards by conspicuous boards. One mile from each yard is placed a board; and another is at the

yard limit. These are so large that they cannot be passed unnoticed. The observant traveler will probably notice that the movement of trains could be considerably quickened by putting in more water cranes at stations. It is the rule that a train, in one direction or the other, must stop to take water just before reaching the station, and then pull up to the platform. Perhaps the traffic is not yet so dense that it is essential to save every minute, but a few more water cranes would perhaps pay for themselves even now. But on the whole this part, at least, of the East Tennessee, Virginia & Georgia would be creditable not only among "Southern roads," but as a Northern road.

A "World's Congress Auxiliary" has been established for the purpose of displaying, in connection with the proposed World's Columbian Exposition at Chicago in 1893, the progress of science, literature, education, government, religion etc., the aim being to make preparations for holding world's congresses in Chicago during the time of the exposition; and the special field to which the officers of the Auxiliary will devote themselves embraces those matters which would not naturally come within the plans laid out more particularly for an exhibition of material things. One of the divisions established by the Auxiliary is that of railroad construction, equipment and mechanical operation; and another, railroad commerce, including traffic and administrative questions. Local committees have been appointed for these divisions as follows:

For the first, Messrs. E. L. Corthell (chairman), D. J. Whittemore, E. M. Izard, Wm. Forsythe, C. L. Strobel, Robert W. Hunt, John W. Cloud; for the second, Messrs. Geo. R. Blanchard, chairman of the Central Traffic Association (chairman), E. T. Jeffery, of the Grant Locomotive Works, Hon. John W. Cary, and H. R. Hobart, of the Railway Age.

A contemporary, whose title page suggests that it ought to keep in touch with current progress in car construction, says, in a series of notes appropriate to the mechanical conventions, that "current practice does not indicate that malleable iron has any recognized position in car construction. The indications are that where cast iron is too weak or too heavy cast steel will be used in the near future as a substitute." The facts are exactly contrary to this statement. The uses of malleable iron in car construction are rapidly on the increase, and the books of malleable iron companies show larger sales of this material for car construction than ever before. From the brakeheads, brakebeam struts and attachments on the bottom of the modern freight car, to the brake wheels on the top of the brake shaft, there are large numbers of parts which we venture to say are used only in malleable iron by the best roads. Take, for instance, the centre plate, the drawbars, the stake pockets, side-door fittings; who would say that malleable iron has no recognized position in the construction of these parts? Our contemporary must pay more attention to the details of car construction or its title will be a misnomer.

The Florida Railroad Commissioners seem to be out of a job. Both houses of the legislature have passed a bill repealing the law establishing the commission and have adjourned, though the governor's approval is not yet announced. The reports indicate that the probable appointment of an objectionable man as commissioner was the real cause of this action; though it is stated that conservative men were unable to discern any benefits from the existence of the commission sufficient to warrant the expenditure necessary to support it.

NEW PUBLICATIONS.

The Journal of the Iron and Steel Institute, 1890 London and New York: E. & F. N. Spon.

This volume is more than twice as thick as the usual annual volumes of the Proceedings of the Institute. It contains in full the papers and addresses presented at the meeting of the Institute in New York last fall and at the international meeting in Pittsburgh. An appendix gives an account of the excursions made by the Institute in the United States, and the usual notes on the progress of home and foreign iron and steel industries are included in the volume.

The Technograph; No. 5. Published by the Civil Engineers' Club and the Mechanical Engineers' Society of the University of Illinois, Champaign, Ill. Price 50 cents.

This number of *The Technograph* has a very attractive table of contents, embracing 19 different articles on a variety of engineering subjects. Most of these are quite short. The most important one, however, is an article of 27 pages by Prof. A. N. Talbot on Transition Curves. Much of the treatment of the transition spiral is new, and the summing up of the article puts the method of use into a form not only accurate, but convenient.

There is a paper of 10 pages made up by several different authors on Lime Cement Mortars, giving results of tests for strength. A short article by Prof. Baker, entitled "A Clock for Everybody," gives a few hints on the determination of time by simple observations of the heavenly bodies.

Howe's Metallurgy of Steel.—We are informed by the publishers of this remarkable book, the Scientific Pub-

lishing Company, that the Société d'Encouragement pour l'Industrie Nationale, of Paris, France, has awarded to Mr. Howe a prize of 2,500 francs for this work. This is a well-deserved compliment, and is a recognition of the importance of Mr. Howe's contribution to scientific literature.

TRADE CATALOGUES.

Illustrated Catalogue of the Gold Car Heating Company. New York and Chicago: 1891.

We have received advance sheets of the very handsome new catalogue issued by this company. It illustrates in great detail the many devices which the Gold Company now offers. The storage system is of course the best known of Mr. Gold's plans for heating cars, but he offers besides direct steam, and water circulation, systems. The details of all of the Gold equipment and fittings are worked out with uncommon mechanical ingenuity. They are remarkable for their simplicity and good design. In the new catalogue especial attention is called to certain recent improvements and inventions, viz., a duplex double coil, to use with a stove; a special double coil, to be used under the car, with hot water circulation; improvements in steam couplings, train-pipe valves and pressure regulators.

Sections and Mechanical Conditions of Car Wheels.*

What engineer can describe the section of car wheel best adapted to safety? (I am speaking of chilled wheels, the kind that is under 90 per cent. of the equipment in this country.) Who can say from actual knowledge how much the wheels under the cars of his company vary in diameter from each other on an average? or how much they are out of round or out of balance? or whether wheels of the same weight are placed on each axle?

The best section of wheel depends largely on the service intended and upon the quality and character of the wheel, but certain lines should be followed irrespective of these two conditions on all steam roads.

The strains imposed on a wheel are of two kinds: the first consequent on load carried and speed attained; the second that which results from the use of brakes. The first strain multiplies the second in a definite degree.

It is not only necessary to consider in connection with this matter the speed proposed for general use or the loads intended to be carried, but it is absolutely necessary to consider the maximum that could possibly be imposed, and to provide a margin of safety beyond that. You provide for strains in other construction that are beyond anything met with in service. The same must be done in a car wheel if absolute safety is sought. There have been more people killed and property destroyed with broken wheels than with defective bridges. So much for the need of a known basis to follow in the construction of wheels.

It does not follow at all that good wheels will be made because a pattern of proper section is used. That is the first necessity; the second is the method by which the wheels are made. The manufacture of car wheels is hard, laborious work. A first-class molder, if given a car wheel to make with ordinary foundry tools and appliances, would make possibly one or two for a day's work, and consider it a big day's work at that. Special tools and appliances are provided for the business, however, and one man with a helper will turn out on the average eighteen wheels per day.

The work is done almost invariably by the piece, and is commenced and finished in ten hours or less. Half of this is given to molding and the balance to casting. To prepare and finish eighteen molds in five hours necessitates doing the work on one in less than twenty minutes. This does not afford much time for the proper carrying out of the many necessary and important details, and with workmen not very expert many chances are taken for imperfect work. . . . The most exacting attention to every detail is necessary in preparing and melting the iron. If not given, it may not always produce dangerous conditions, but it will not produce perfect ones. . . . Any wheelmaker who cannot furnish test bars from his mixture, 1 in. square and that will carry 2,500 pounds load between supporters 12 in. apart, is not using a mixture that is what it should be; and if such bars will not carry 2,000 pounds the wheels are positively dangerous for use.

After the wheel is cast it is placed in the annealing pit. Properly speaking, car wheels are not annealed; they are slowly cooled, for the reason that in the process of manufacture the outer part of the tread is cooled and set at a degree of heat lower than that existing in the body of the casting (this on account of the chilling process), and the entire casting must again be brought to a uniform heat and cooled evenly. The cooling pits, as they may be properly called, should be in dry ground. If dampness is found and steam is seen arising from the pits while the wheels are cooling or when they are being removed, shrinkage strains will certainly be found in the wheels and they will be liable to break in service. When such conditions exist they are always indicated by a reddish color on the wheels when cold. . . .

What engineer would consider for a moment the use of a track in which the following conditions existed? A rise or buckle of 1/8 of an inch, and a curve in and out of 1/4 of an inch in every 9 ft. Yet, as a mathematical proposition, what is the difference between running two wheels of exact diameter and perfect roundness, fitted to an axle, over such a track as described, as against running two wheels 1/8 of an inch out of round, and that vary in diameter 1/8 of an inch, over a perfectly true track? The same rise and fall of the load must occur. The larger wheel would gain 1/4 of an inch in every 9 ft. and it is manifest that it cannot continue gaining; it must be forced back or the smaller one pulled forward, or the wheels would not stay on the rail. You may think the conditions cited in the latter case are exaggerated, but, in fact, they are the minimum conditions of variation in wheels. The Pennsylvania Railroad specifications now under consideration for adoption by the Master Car Builders' Association accept wheels that do not vary more than 1/8 of an inch from a true metallic ring placed over them. To place such a ring over a cast surface not tooled would certainly take 1/8 of an inch all around, making up 1/4 or 1/2 of an inch. All things considered, to make castings weighing 1/4 of a ton and over true to 1/8 of an inch to centre as they come from the

* Extracts from a paper read by P. H. Griffin, Assoc. Am. Soc. C. E., at the Chattanooga Convention.

STATEMENT OF STEEL TIRES BROKEN ON RAILROADS OF GERMAN EMPIRE IN YEARS 1884 TO 1889, INCLUSIVE.

Years.	Cast steel.		Fusion steel.		Martin steel.		Manganese steel.		Bessemer steel.		Other steel.		Puddle steel.		Number of steel tires on hand and in use.	No.	Per cent.
	On hand and in use.	Broken.	On hand and in use.	Broken.	On hand and in use.	Broken.	On hand and in use.	Broken.	On hand and in use.	Broken.	On hand and in use.	Broken.	On hand and in use.	Broken.			
1884....	106,838	259 0.24	197,573	298 0.15	53,922	32 0.10	1,835	.....	380,189	834 0.22	6	.....	201,522	1,410 0.70	941,945	2,853 0.30	
1885....	94,365	370 0.39	221,212	464 0.21	66,848	107 0.16	1,463	6 0.41	402,140	1,208 0.30	302	16 5.30	173,371	1,378 0.79	959,682	3,549 0.37	
1886....	96,029	294 0.31	189,688	500 0.26	35,694	177 0.19	2,039	.....	433,857	1,771 0.39	244	32 13.	187,013	1,214 0.77	992,636	3,988 0.40	
1887....	99,768	267 0.27	129,232	304 0.24	171,570	169 0.10	1,765	17 0.96	511,030	1,369 0.26	214	2 18.08	134,615	780 0.58	1,037,996	2,964 0.29	
1888....	92,303	348 0.38	115,617	380 0.33	244,522	241 0.12	1,419	18 1.30	510,925	1,998 0.39	170	68 40.	115,387	821 0.71	1,041,133	3,874 0.37	
1889....	64,399	174 0.27	140,635	311 0.22	284,815	341 0.08	1,251	.....	510,985	1,909 0.37	440	65 14.8	100,456	680 0.68	1,102,941	3,380 0.31	

foundry, is remarkably good practice. On the question of variation in diameters, $\frac{1}{16}$ of an inch is a very low average. Not alone the original, but the condition after service must also be considered.

The precise nature of the result would be exceedingly difficult to get at by computation; it could only be determined by actual test of perfect conditions as against ordinary ones. The larger wheel unquestionably leads at all times, and the smaller one necessarily draws behind. The greater the load and higher the speed the more certain an extreme condition of this kind will prevail. With the flange grinding the rail instead of running free, power is wasted and undue wear occasioned. It is difficult to locate loss of power or rail wear caused in this way in specific cases, but when the car wheel speaks the whole story is told. Flange wear is the leading cause of wheel failure to-day in every type of wheel, and it has grown in exact proportion to the increase in load and speed. . . . There is no mystery about what constitutes good mechanical practice in other things. If you go through your shop and find shafting out of line, pulleys mounted out of centre, or vibration in both due to lack of balance in the pulleys, you stop it at once. It is bad practice—dangerous work. Your shaft revolves perhaps 200 times per minute—a pretty good speed for shafting. Your pulleys, say, 33 in. in diameter, weigh 300 lbs. If they are a couple of pounds out of balance, $\frac{1}{16}$ of an inch out of true; if your line shaft is out of true $\frac{1}{16}$ of an inch in every length, you would not assume the responsibility for that sort of work many minutes and expect safety or economy as a result. But you accept car wheels revolving 300 to 600 times a minute, weighing twice as much as the pulley, and from 2 to 20 lbs. out of balance, and you do expect safety and economy as a result. You could not mount a pair of wheels taken from under a car in the heaviest bearings and revolve them 500 times a minute. Leaving all considerations of load carried, tons of brake pressure applied, and the multitudinous conditions of service aside, and dealing with the simple fact of running the wheels in fixed bearings at that speed, it could not be done, simply because they are out of balance. You would not stand around at close range when it was being tried, either. But you put them under a passenger car and repeat the same conditions, or greater ones, with little thought of consequences. Centrifugal force and power required to do work under one or another condition have no different cause or effect in either case. There is the question of the difference in result given by the pulley as against the car wheel, when it is considered that one runs on a fixed centre and the other on a moveable one, as well as being supported on its periphery. But when it is remembered that the car wheel does many times the work of the pulley the results cannot be much different.

Whether it is possible in railroad service to obtain in the beginning and maintain in practice perfect conditions of this kind is a simple mechanical question. What the result would be if it were done cannot be exactly stated, because it has never been tried, but it is no unknown field to work in; there is no experiment about it. If it cannot all be accomplished at once it can at least receive a share of the effort made in other and similar directions.

So long as this question is determined by foundry practice alone and wheels are used as they come from the foundry, it is certain the conditions necessary will not be obtained. It is necessary to find a true centre and finish a wheel from that in a mechanical manner to obtain a proper mechanical condition. One of two things will certainly have to be done—railroads will have to adopt steel wheels, for the mechanical work on which they seem willing to spend hundreds, yes, thousands, of dollars, where they question that many cents to obtain in chilled precisely what they seek in steel wheels, or they will have to turn and balance chilled wheels. They are progressing step by step to heavier loads and higher speeds; they are forced to. They are equipping freight cars with air brakes. For what? That cars may carry more and run quicker. It is one thing to apply the brakes on a car which, with its load, weighs 30 tons, and runs at 30 miles an hour, and have a brakeman do the work of transferring the power of one man through a $1\frac{1}{2}$ in. brake-mast, with a leverage of 6 to 8 in. from centre; and it is another thing on a train running at double the speed, with double the load, to put at the command of the engineer on a train of 30 cars a power of 50,000 lbs. per car for instant use. Think of it! If the air brakes are in proper condition on such a train the engineer has stored up in the air tanks under the cars a total force of 750 tons available for instant use. It will probably make some difference under such conditions whether wheels are round or balanced. It is making the difference now.

The best wheel is the one that will not break, that is mechanically perfect and that will retain its original conditions for the longest time. We have proved to our own satisfaction that the chilled wheel can be made to fulfill these conditions, and have a total of 600,000 in every kind of service without one case of breakage, as proof of possibly safety.

One-sixteenth of an inch chilled iron will give more wear than six times that quantity of steel found in any steel tire. It must be remembered that steel tempered and hardened into cutting tools and steel not so treated are very different things, and that the latter condition is always the one found in steel tires. Furthermore, the life of a steel wheel in the severe service of to-day is not all in the flat surface of the tire; it is largely in the flange. To provide proper flange thickness on many steel wheels, from 20 to 40 per cent. of the tire must be turned off and thrown away.

At best it is difficult to say what the entire result of the imperfect conditions referred to are in the practical operation and expenses, but as a conservative statement, based on long and careful investigation of the subject, I believe that with mechanical conditions such as they should be, and such as can be maintained without difficulty on chilled wheels, the cost of power operating traffic carried over can be decreased from 15 to 20

per cent. The cost of wheel service can be decreased from 25 to 50 per cent., and the saving in wear on equipment and permanent way will be in like proportions.

On the wheel subject generally a few words may be said. We have not studied and worked at it from the one standpoint of chilled-wheel manufacturers, but have obtained all the information possible on the manufacture and use of the different types of wheels in all countries and on the results obtained from them. You will find in the Appendix a very complete and interesting statement of results obtained from steel wheels in Germany during the past five years. It is instructive to those who consider steel wheels as the only proper thing for safety.

A large consumer of steel wheels said to me recently that it took an average of 200 per month to keep up his equipment, at a cost of \$10,000 per month or \$120,000 per annum, not to mention the cost of many lathes for returning the tires or the cost of the work; and yet he had more breakages of steel wheels than he ever had of chilled wheels in like periods. He said that if it were not for "public opinion" he would go back to chilled wheels. Well! Consulting public opinion at a cost of \$120,000 per annum for a cause he personally did not believe in could not be very satisfactory business.

There seems to be some inexorable law that ties some purchasers of chilled wheels down to a price that would not buy common iron castings, and that compels them to hold all wheels of that class as of one value and quality. Thirty-three inch wheels, weighing 600 lbs., are sold commonly to-day for prices that do not net the maker \$8, freight and other expenses considered, a net price of $1\frac{1}{2}$ cents a pound. The best car-wheel iron cannot be bought for such a price; and just how the purchaser expects the manufacturer to furnish fuel, merchandise of all kinds, plant, labor and the general expenses of the business, and produce a good article, is a hard question to answer. Fortunately all wheel buyers do not follow such a practice, but so many do that the others think a dollar or two more should produce something extraordinary, when as a matter of fact they pay more per pound for their brakeshoes than they do at the highest price for wheels. If improvements in this matter are to be made it must be considered from all standpoints and the same influences brought to bear upon it that have produced the highest type of modern engineering—the modern railroad.

The "connecting link" must be made as perfect as the parts it connects.

George W. Parker on Profit Sharing.

Mr. George W. Parker, President and General Manager of the St. Louis, Alton & Terre Haute, in his annual report, just published, advocates dividing profits with employees, which, he says, has long been a cherished desire of the management. The plan could not be carried out because hitherto even the stockholders have got no dividends, but with a favorable bond market it is hoped to realize sufficient funds from the bonds received in payment for a part of the road recently sold, to put the stock on a paying basis. This would justify the management in recommending it as a safe and remunerative investment. Mr. Parker continues:

This point gained, and the way will be clear to successfully introduce profit sharing, and thus secure the sympathy and co-operation of those to whom the possession and use of the property of the company is necessarily committed. While we have an exceptionally good and faithful corps of employees—many of them having been trained up from boyhood on the road—yet there are all sorts of influences at work, the tendency of which is to alienate their sympathy from the company, and cause them to cherish a feeling of more or less antagonism toward the company. Under the guise of society paternalism, designing leaders, for the purpose of gain or love of power, bring about this result. To counteract these baneful influences and bring the officers and employees of the road into greater harmony, it is suggested that, as soon as practicable, they be taken, so to speak, into partnership with the owners of the property, and permitted to share the profits of the enterprise by a fair division of the net earnings annually. It is not contemplated that the pay of the officers and employees should be changed. That would continue to come under the head of operating expenses, and be first paid; then the capital employed should be next considered and receive its allotted recompense.

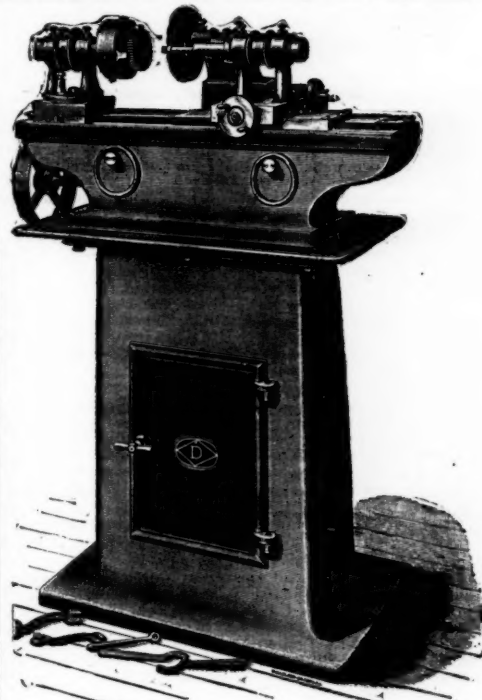
The surplus earnings, after thus compensating labor and capital, might be divided between labor and capital on an equitable basis—each officer and employee on the road at the end of each fiscal year, and who has served the company for a given period, to receive a share of the surplus net earnings, in proportion to his salary or wages. The immediate influence of this would be to make the men directly interested in the financial result of the year's operations, and superinduce corresponding care and diligence.

There is no other kind of business that is so dependent on its employees for success as railroading. Unlike nearly every other business, the real owners of the property seldom participate in its active management; they confide it to others; and the problem is to so interest the latter as to influence them to exercise that care and diligence that prudent men employ in their personal business. This accomplished, and the result would at once manifest itself in a large increase of net earnings. The labor dividends would soon find investment in the dividend paying capital stock of the company, and thus a property relation between the company and its employees would soon be built up, and stand as a guarantee of faithful and efficient service, compared with which labor organizations, however alluring, would soon lose their attraction. The incentive to strikes would be thus removed.

Special Automatic Face and Hole Grinder.

The accompanying illustration shows a grinder recently constructed by the Diamond Machine Company, of Providence, R. I., specially for grinding automatically and simultaneously the hole and one side face of a piece of work such as a milling cutter.

For this purpose the work is held in a chuck in the usual manner, and there are two grinding spindles, that for the internal grinding being mounted upon a head, which has a movement on the bed to and from the main head, while the other spindle is traversed in a direction at right angles to this, for facing; their respective movements being so timed as not to interfere with each other, and the traverse of each being adjustable separately.



Automatic Face and Hole Grinder.

Either spindle can be used independently if desired. Holes to the depth of 4 in. can be ground, and the side faces of disks up to 10 in. diameter.

The spindles are of steel, running in split, phosphor bronze bearings, and all working parts are protected from dust, most of these being within the bed of the machine.

The machine was built to order by the company named, and is illustrated as typical of such grinding machinery built by them for special purposes.

Electric Welding.

In a recent issue (May 29) we gave an abstract of a paper by Dr. F. A. C. Perrine on the subject of electric welding, which was read at the general meeting of the American Institute of Electrical Engineers May 20. Below follow some extracts from Prof. Elihu Thomson's discussion of that paper:

In relation to the wheel in which the cast hub is joined to spokes, there is one point that I might mention, that the possibilities are very well shown in that wheel of performing a number of welds at one operation. There we have the spokes set in place in the machinery and radiating toward the hub, and the machinery grasping the spokes separately, welding them all at one application of current, so that we have a number of welds all in multiple as it were. The other case is an excellent example of a different procedure, where the spokes radiate toward the centre and are caught as it were, and pinched between two surfaces which are being welded and are therefore securely fastened. These are isolated examples of what processes are capable of being performed by the new art.

In regard to the changes of structure which are undergone by materials subjected to the welding process, that was of course noticed rather early. It was particularly prominent in the case of hardened steel, which underwent a decided change during the welding. A tendency to granulate of course comes there. The old idea was that the steel was burnt, but I have tried this operation in a hydrocarbon atmosphere, and it occurs just as well there, so that it is not a burning process. It is not a burning operation. It is simply the relaxation of the molecules, the change of physical condition, or, perhaps, the chemical combination brought about by the high temperature.

Another feature of the welding operation has been mentioned which is interesting, which is that some materials when put together do not mutually yield during the heating; one as it were overlaps the other, the reverse riveting, as it has been termed by Dr. Perrine. One melts or softens and slips over the other. For many purposes that is a very strong joint, particularly if the burr or expansion is not removed. There has been no change of form or very little change of form of one bar. To be sure, if the inclosed bar doesn't change at all the union may be a perfect one. It may be that the outside piece in fusing over the others has brought just the same intimate relation of molecules of one and the other bar as though this had undergone a deformation or change. But in most cases it would naturally be expected that the best joint would be produced by, as it were, bringing to the front new molecules, perfectly clean and unchanged molecules, from the interior, in contact with the molecules of the other bar, which are also spreading and moving; and that is actually true. Advantage has been taken in a few instances of this kind of action

to make a joint by cutting a number of steps in one metal and causing the other, as it were, to dovetail itself by a simple flowing over, and that in some instances makes an excellent joint. The metal flows over and fills all around, and if it has any tendency to unite, such as brass and iron have, or brass and steel, of course the union is very strong.

It is curious to notice how prejudice stands in the way sometimes of the best results. undoubtedly there are cases where the burr left by the welding operation would be best left on because there is an increased section there, but from the mere habit of not seeing things done that way where that expansion would not do any harm if allowed to remain, people want it removed. It could in many cases be forged up to form a handsome bead, but in most cases it must look like the ordinary scarfed weld or it is not altogether marketable. That, I think, is a temporary condition for many cases of welding.

TECHICAL.

Manufacturing and Business.

The firm of McCoy & Sanders, 26 Warren street, New York City, established in 1798, was dissolved May 30, and is succeeded by Jos. F. McCoy Co. The new firm represents Pengeot Frères; "Lion" brand of cold-rolled steel band-saws, tools, etc.; Société Le Nickel; Weiller & Co., and leading makers of railroad, machine shop and mill supplies.

The Louisville, New Orleans & Texas has just put in a full equipment of new wood-working machinery for its new Vicksburg shops. Greenlee Bros. & Co., of Chicago, made all the special wood-working machines.

The contract for the metal work for the first of the large buildings for the Columbian Exposition at Chicago in 1893 has been awarded to the King Iron Bridge & Mfg. Co., of Cleveland, O. The building will be known as the "Mines and Mining Building."

Charles W. Whitney, 81 Fulton street, New York, has received an order from the Southern Pacific Co. for a set of 2½ in. Serve patent ribbed boiler tubes for locomotive use. The tubes will be shipped to the shops of the Morgan's Louisiana & Texas road at Algiers, La. This tube was described in the *Railroad Gazette* of April 24.

The New York Belting & Packing Co. (Limited), New York, is introducing the "Vulcan" spiral piston packing, designed to be self-lubricating and to fit any size rod.

The Falls Hollow Staybolt Co., of Cuyahoga Falls, O., makes the important announcement that, owing to the increased facilities and the great quantity of mandrel-rolled hollow staybolt iron it now produces, it offers its production at prices far below the cost of drilling solid bolts. The firm supplies any size from ¼ in. to 1½ in. with any inside diameter required. The hollow staybolts have been shown to be stronger for the service required than solid bolts and are specified by a considerable proportion of the railroads. Nearly all the locomotive works use them when not specified.

The Kalamazoo Railroad Velocipede & Car Co., of Kalamazoo, Mich., is in receipt of an order from Zurich, Switzerland, for 100 of the Kalamazoo No. 7 four-wheeled velocipede cars. Some of the cars are to be shipped to Lucerne and the others to Athens, Greece. This is a duplicate order given by railroad companies which have had these velocipede cars in use for a year or more. The firm reports that the No. 7 car is now ordered much more frequently than the three-wheeled car. There is no danger of its being derailed, and it has an advantage in the facility with which it can be run backward as well as forward.

The Canda Manufacturing Co. has been organized in New Jersey with a paid up capital stock of \$49,500, to manufacture and lease railroad equipments. The incorporators are Charles J. Canda and Ferdinand E. Canda, of New York, Charles P. Houghian, of Brooklyn, Edward S. Savage, of Woodbridge, N. J., and others.

At the recent Newport session of the Rhode Island State Legislature bills were passed incorporating the following companies: Rhode Island Steel Casting Co., Tockwotten Machine Co., Hathaway Steam Trap Co., Safety Bolt & Nut Co., Easton & Vernon Machine Co., American Electrical Works and Benham Steam Engine Co.

The Sigourney Tool Co., Hartford, Conn., is erecting an addition to its machine shop which will be ready about July 1. The extension is 85 x 32 ft., two stories high and built of brick.

Extensive alterations are being made at the Lowell (Mass.) Machine Shop Foundry, which will, when completed, make it one of the best arranged foundries in the country. The iron is to be carried about the shop by means of overhead cranes with trolley system. Four large pivot cranes are to be removed, which will give much valuable floor space. Iron and coal are to be conveyed to the cupola automatically, and casts, or pouring of the molds, will be made but once a day.

Iron and Steel.

The Henderson Steel & Mfg. Co., of Birmingham, Ala., has adopted a recommendation of the special committee to make financial arrangements for the completion of its second furnace and the construction of a 300-ton blooming train.

The F. T. Aschman Steel Casting Co., of Sharon, Pa., has applied for incorporation as the Aschman Steel Casting Co. The incorporators are: J. J. Spearman, E. A. Wheeler, F. T. Aschman, Edward Roberts, W. S. Roberts, G. A. Baird and Fay Alderman. The plant of the firm will be enlarged.

Morris, Williams & Bailey, of Pittsburgh, manufacturers of cold-rolled steel, have commenced the erection of an iron building 85 x 45 ft. in size, which will about double their present capacity. New rolls, engines and the other necessary equipments will be put in and the present annealing furnace enlarged.

The Harriman Wrought Iron Co. has been established at Harriman, Tenn., for the purpose of manufacturing wrought iron direct from the ore.

The Minneapolis Rolling Mill Company has been recently organized at Minneapolis, Minn.

In a recent interview, President Clarke, of the Thomas Iron Co., speaking of his own company, says the production and sale during the last six months are the largest in its history, being more than 100,000 tons. Steel rails are more active. President Clarke sold for the Lackawanna Steel & Iron Co. to C. P. Huntington 40,000 tons of rails last week and 6,000 tons to other parties. Mr. Clarke says no rails have been sold below the agreed upon rates, \$30 per ton, except to the Pennsylvania, which obtained a concession of 15 cents per ton on a disputed question relating to freights.

The universal plate mill and machinery of the Elmira Iron & Steel Rolling Mill Co., of Elmira, N. Y., has been leased for one year by N. D. Doxey, formerly Superintendent of the plate and bar mills of the company, and J. F. Bailey, of Philadelphia. The rolling mill has been idle since June, 1890, when the men went on strike.

Wm. Swindell & Brothers, engineers and contractors, of Pittsburgh, have recently completed the erection of a seven-ton open-hearth furnace for the Trenton Iron & Steel Company, of Trenton, N. J. The furnace was erected for the manufacture of special steel castings. For the Atkinson Steel Co., of Chicago, the firm has completed the erection of a 10-ton open-hearth furnace to supply the Atkinson Spring & Steel Works, of Chicago, with spring steel. For the Johnson Company, of Johnstown, Pa., the firm is erecting a seven-ton open-hearth furnace for steel castings.

A ferro-manganese furnace may be erected at Rome, Ga., by R. F. Williams, of New York, and others. The capital of the company, including plant and 3,000 acres of mineral land in Floyd County, will be about \$300,000. Plans will be decided on at a meeting to be held shortly for organization.

The Rio Grande Southern has ordered 700 tons of rails, with track material, from the Colorado Coal & Iron Co.

The Roanoke Rolling Mill Co. will, it is stated, be reorganized with a capital stock of \$100,000, and with G. B. Lessig, of Pottstown, Pa., as Manager.

The Kensington (Pa.) Steel Co. is negotiating for the purchase of a site for a fine open-hearth and crucible steel works at that place.

The East Lebanon Iron Co. has been formed at East Lebanon, Pa., to erect a rolling mill at that place. The capital of the company is \$100,000. N. E. Legat is President.

It is reported that the Talladega Iron & Steel Co., at Talladega, Ala., will issue \$200,000 of bonds in order to make extensive improvements on the furnace, which will be put in operation under a new management.

The Spang Steel & Iron Co., of Etna, Pa., is to make extensive additions to its plant, including furnaces, new buildings and machinery, at a cost of \$250,000.

The Rail Market.

Steel Rails.—The mills report an increasing business, and expect a number of large roads to place their orders shortly. The quotations are: At New York, \$30.75@31; Pittsburgh, \$30 at mills, and at Chicago, \$31.

Old Rails.—The quotations are: At Chicago, \$22.75 for iron rails and \$14.50@17 for steel rails; and at Pittsburgh, \$23@23.50 for iron rails, and \$17.50@18 for steel rails.

New Stations and Shops.

The city of London, Ont., and the Grand Trunk Railroad have made a preliminary arrangement for the re-establishment of car shops in London. The agreement entered into provides that for a bonus of \$100,000, and the company agrees to regularly employ 500 men on the average, in the construction and repair of all the cars used in the service west of Toronto.

The City Council of Des Moines, Ia., has passed an ordinance vacating certain streets and alleys and empowering the Des Moines Union Railroad to use the parts vacated in the erection of a union station. The roads that expect to use the new structure for passenger service are the Chicago, St. Paul & Kansas City, the Wabash, the Chicago, Milwaukee & St. Paul, the Des Moines & Northern and the Des Moines & Northwestern.

The Grand Trunk Junction road has decided to erect an immense freighthouse, with offices, in Chicago. The company controls the entire west front on Third avenue, back half way to State street, extending from Taylor street south to Twelfth street, making in all 856 feet frontage. For the present the freighthouse will be but one story high.

The Wheeling Bridge & Terminal Co. has awarded to Jonathan Clark & Sons Co., of Chicago, a contract for the erection at Wheeling, W. Va., of a \$15,000 station for the terminal railroad. The building will be erected on Market street. It is to be of wood, 80 x 85 ft., and to have an average height of 20 ft. Work will be begun July 1.

The Wilmington & Northern has purchased at Reading, Pa., a tract of land, nearly 1½ acres, near the business section of the city, bounded by three streets, for \$28,250. A handsome station will be erected.

The new machine shop for the Ball & Wood Co., at Elizabethport, N. J., is approaching completion. The building is of brick and iron, designed and built by the Berlin Iron Bridge Co., of East Berlin, Conn. The central portion is 40 ft. wide with wings on each side 20 ft. wide; the entire central portion of the building being served by a traveling crane driven by electricity.

Car Couplers.

"The Burlington, Cedar Rapids & Northern, which has been experimenting with several different makes of vertical plane car couplers, is so well pleased with the service obtained from the California steel coupler (Fox patent) that previous orders have been duplicated. Mr. C. J. Ives, the President of the road, is engaged in a thorough investigation of the relative merits of the M. C. B. couplers.

THE SCRAP HEAP.

Notes.

The Chicago & Northwestern has taken back about six per cent. of its Chicago switchmen who were locked out.

A new iron bridge, 200 ft. long, just erected over the Osage River, at Nevada, Mo., was blown off its supports and wrecked by a severe wind June 1.

Director Adolph Schreiber, of the Illinois Central, together with another agent of the road, are in Central America hunting up "pointers" for the traffic department.

Illinois has passed a revised law concerning consolidation of railroads, purchase of stocks by railroad companies, etc., which is expected to be of material advantage to Illinois companies in making extensions in other states.

The Aldermen of New York city have enacted an ordinance making it a misdemeanor for an engineer or railroad employé to permit the escape of smoke from a tunnel by the use of bituminous coal, and making the penalty a fine of \$50.

The New York and Brooklyn Suburban Investment

ing across Long Island from Long Island Sound to the Great South Bay, and proposes to build a bicycle railroad. The Sound terminus will be at Rock Point, and it is proposed to connect with either New Haven or Bridgeport by steamers.

The engineman of a passenger train on the Pennsylvania road between Pottsville and Wilkesbarre, Pa., became deranged while running one day last week and frequently stopped on account of imaginary freight trains ahead. The conductor had to do a good deal of coaxing and was obliged to ride in the cab to get him to finish the trip.

A few weeks ago an accident occurred to the Winnipeg express on the Canadian Pacific at Straight Lake, in which cars were burned, the mail car among them. It has transpired that in the burnt mail bags was the sum of \$20,000, which had been mailed from two banks to Winnipeg by order of customers. One package of \$10,000 has been entirely destroyed, but there are sufficient portions of some of the second package to enable the bank to recover several thousand dollars.

The coroner has finished his investigation of the dynamite explosion on a work train of the New York Central, near Tarrytown, N. Y., May 19, which killed 20 men. The jury returned a verdict that the victims died from concussion of the brain, and they censured the foreman, the conductor and the assistant foreman, now dead; and the President and Board of Directors of the New York Central & Hudson River Road for allowing explosives to be carried in a careless manner.

The Brotherhood of Railway Employes' Home, of Chicago, of which Mr. L. S. Coffin is a director, has been incorporated under the laws of Illinois as a charitable institution, and the first annual report of the Secretary, J. B. Spencer, has been issued. It appears that the home depends upon voluntary contributions from local lodges of railroad employes' associations. It has had four inmates thus far. Receipts from donations, \$1,028; from profits on a monthly publication issued, \$834; total, \$1,862. The organization has a four-acre homestead with some buildings, held under a 99-year lease, but the circular does not say in what geographical quarter of the territory of Chicago it is located.

New York papers of last Monday had each an article of a half column or less telling how a conductor and brakeman on an elevated railroad train assaulted a passenger (at Fifty-third street and Eighth avenue, on Sunday morning, at 5 o'clock), who, being allowed insufficient time to alight, pulled the bell rope and stopped the train. It appears that the passenger rode to the next station, started off while the train men were engaged in a controversy with other passengers who sympathized with him, was forcibly brought back, and then offered resistance which culminated in a fight. The Police Justice dismissed the passenger and told him to complain of the trainmen, and then he held the latter in \$300 bail each. The trainmen say that the passenger was under the influence of liquor.

Foreign Notes.

A number of French papers appear to be exercised over the proposed tunnel through the Pyrenees to connect directly the railroad systems of France and Spain, and emphatically protest against its construction. The war scare seems to be the prominent factor in the agitation, and the opening of such a tunnel would, it is argued, be a standing invitation to Spain to invade France.

The Right to Use Ground Wires.

The Supreme Court of Ohio has rendered a decision reversing the decision of the lower court, in the case of the Cincinnati Inclined Plane R. R. Co. against the City and Suburban Telegraph Co. Action was brought by the telegraph and telephone companies to enjoin the Inclined R. R. from operating its line by the Sprague system (single trolley method), on the ground that by its use the telephone system was rendered practically useless. The telephone people claimed a prior right to the use of the earth as a means of securing a return circuit. The court upholds the theory that the street is primarily intended for the use of the public for traveling and transporting goods, and practically that if the motive power employed for this primary use interferes with a secondary use, the law cannot help it. It has been said that this decision makes free property of the earth as a conductor—that is, that the company using the most powerful current may crowd out smaller concerns by sheer superior power; but it is more accurately described as above indicated—as holding a railroad more important than a telegraph or telephone.

Electric Traction.

In discussing a paper on electric railroads recently read before the French Society of Civil Engineers, Mr. Arnoux, after comparing the three existing methods of electric traction—the overhead, the underground and the storage battery methods, pointed out that the last was the oldest of them all having been tried—for the first time in May, 1881, by N. J. Raffard, between Paris and Versailles. An omnibus belonging to the Compagnie Générale des Omnibus, having a capacity for 50 persons and weighing about 3½ tons, was used in the experiment. The motor was one of Mr. Raffard's own design, and power was supplied by a battery of 100 cells, furnished by the Société Force et Lumière, of Paris.

Timber From Cochinchina.

French journals announce the arrival at Havre, France, of a cargo of timber from Cochinchina. This is believed to be the first serious attempt to create a market in France for this yet little-known material. The wood possesses a number of eminently desirable features, among them those of considerable density and durability, and is said to be available in large sticks, ranging in length from 35 to 40 ft. Several specimens which were sent to France more than a year ago, for test purposes, are understood to have given entire satisfaction in railroad use, having proved efficient substitutes for teak, oak, and several other varieties of European timber. It now remains to be seen whether its cost will admit of its more general introduction. The enterprise is in the hands of the Compagnie Commerciale des Colonies Françaises, of Paris.

To be Continued in Our Next.

ROCHESTER, June 3.—John Robinson, who has a menagerie at Ontario Beach, had a bear shipped by express from Buffalo in a crate. While en route, Messenger Tygart was frightened to see the brute break from his cage and advance toward him angrily. Tygart fled to the tender, slamming the door behind him, and the bear, in a furious rage, was not molested until the train reached Rochester. The bear contained several barrels of fish, crates of strawberries, numerous crocks of butter, and some fancy crackers, to all of which Bruin helped himself. Those who had the temerity to look through the

windows of the car at Rochester found the animal plastered from head to foot with butter, to which fish and strawberries adhered in a highly grotesque manner. All efforts to dislodge the brute proved unsuccessful. The car has been sent on to Ontario Beach with the bear still holding the fort.

The Turkish Brigands.

A railroad train was recently derailed by brigands between Constantinople and Adrianople, and some of the passengers captured and robbed. One of the passengers was Herr Israel, a Berlin banker, and he was sent to Constantinople to secure a ransom of \$40,000. By order of the brigands he deposited the ransom with the Austrian consul at Kirk-Kilissia, but at last accounts they refused to treat any further for the release of the prisoners unless the troops would first cease to menace the communications between the brigands and the friends of the prisoners.

Railroad Taxes in Pennsylvania.

The Supreme Court of Pennsylvania has affirmed the decision of the lower courts giving the Commonwealth the right to impose taxes on the gross receipts of the following railroads: The New York, Pennsylvania & Ohio, the Tioga, the New York, Lake Erie & Western and the New York, Lake Erie & Western Coal and Iron Company.

The Bensonhurst Electric Railroad.

The Brooklyn City Street Railroad has recently completed an electric line to Bensonhurst, N. Y., 6½ miles. The road is called the Bath, Bay Ridge & Bensonhurst, and trains began running over it May 28. The Thomson-Houston overhead trolley system is used, and the trains make the run, including stoppages, in about 35 minutes. The power plant temporarily located at the foot of Fifty-second street, Brooklyn, is to contain eight generators, six of which have been installed. Twenty motor cars and an equal number of tow cars have been built for the company by the Lewis & Fowler Mfg. Co., of Brooklyn. The road extends from the Thirty-ninth street ferry, South Brooklyn, N. Y., south along Second avenue to Sixty-fifth street, to Third avenue, to Bay Ridge avenue, to Thirteenth avenue, to Eighty-sixth street, to Twenty-fifth avenue, and from thence to Bensonhurst.

The main line is being extended along Twenty-fifth avenue to Coney Island, and will necessitate the construction of trestle work from Gravesend station, as the land is very swampy in this region. Boats will also be run from Gravesend, tapping Coney Island at Morton's Point. J. N. Smith, 155 Twenty-second street, South Brooklyn, Division Superintendent of the Brooklyn City road, is Superintendent of the new line.

LOCOMOTIVE BUILDING.

The Cleveland & Canton this week received a new passenger and three freight engines from the Brooks Locomotive Shops. Another passenger and two more freight engines will arrive next week.

The Cincinnati, Wabash & Michigan will, it is reported, soon place orders for five new locomotives.

CAR BUILDING.

The Pennsylvania Co. has, it is reported, let the contracts for 1,000 cars for its Southwest System to the Ohio Falls Car Co. and the Terre Haute Car Co.

The Burlington, Cedar Rapids & Northern has invited bids on 500 box cars, and will let the order for building them in a few days.

It is reported that the Cincinnati, Wabash & Michigan will soon be in the market for 400 freight cars and six passenger cars.

The Lake Erie & Western will soon begin to receive new box cars at the rate of 25 a day until the recent contract for 1,500 cars is filled.

The new Adirondack & St. Lawrence is having a number of box cars built at the shops of the Buffalo Car Manufacturing Co.

BRIDGE BUILDING.

R Aberdeen, Or.—A drawbridge across the Wishkuk River has just been completed. It has a span of 125 ft. and a second bridge across the Wishkuk, of similar dimensions, is being built half a mile above Aberdeen.

Anacortes, Wash.—The Portland Bridge Co. has the contract for building the Swinomish slough iron bridge for the Seattle & Northern road. The bridge will cost about \$40,000.

Bangor, Me.—The location of the steel bridge over the Penobscot River for the new electric sheet road from Augusta to the Brewer bridge has been approved by the State Railroad Commissioners. The Pittsburgh Bridge Co. has the contract to build the bridge.

Binghamton, N. Y.—The New York Railroad Commissioners have been petitioned to order the building of a bridge, about 1,000 ft. long, over the tracks of the Delaware, Lackawanna & Western and Erie roads at Binghamton.

Boise City, Idaho.—The Commissioners of Ada County will probably erect three bridges over the Payette and Boise Rivers, near Boise City.

Clifton Forge, Va.—The Alleghany Mining & Development Co. will probably build an iron bridge across Jackson River.

Collinswood, N. J.—The Board of Freeholders will erect a bridge over Cooper's Creek.

Dahlonega, Ga.—Lumpkin County has decided to build a bridge over the Chatahoochee River. It is to have one span of 24 ft., or two spans of 62 ft., and is to be 12 ft. above water line. F. M. Hall is interested.

Fort Worth, Tex.—A large force of men are at work on the North Side bridge across the Trinity River, and steel for the superstructure will begin arriving this week. The main sections of the tubes have been set, and the work upon the superstructure will probably begin this week. The contractors say the bridge will be completed July 4.

Indiana County, Pa.—A bridge is to be erected over the Twolick River from Cookport, Pa., to Pine Flats, by the Indiana County Commissioners.

Kansas City, Mo.—The County Commissioners of Wyandotte County will probably reconstruct the Kansas Avenue bridge over the Kaw River at a cost of \$75,000.

Long Pine, Neb.—Bonds have been voted by this town to build a bridge over the Niobrara River 18 miles north of the town of Spring View.

Manchester, Va.—Plans have been prepared for the construction of a railroad bridge at West Fourteenth street, to cost \$10,000.

Mariottsville, Md.—The engineers of the Howard County Commissioners have recommended the building of the proposed iron bridge over the Patapsco River, with a 93-ft. span. The Commissioners of Carroll County have not yet agreed to the erection of the bridge.

McMillan, Mich.—The Michigan Legislature has passed a bill authorizing this town to issue bonds for bridge purposes.

Moorefield, W. Va.—The County Court of Hardy County will build a bridge across the Potomac River near Moorefield.

New York City.—The New York & New Jersey Bridge Co. at a recent meeting in New York City elected the following directors: George L. Mumford, Rochester, N. Y.; George E. Greene, Goshen, N. Y.; Charles H. Swan and James Langan, Brooklyn; H. B. Archer, Yonkers, N. Y.; Willard H. Mase, Matteawan, N. Y.; John C. Adams, Newburg, N. Y.; and John B. Kerr, Louis Windmuller, W. Wetmore, Cryder, W. F. Dunning, William Bell and Malcolm W. Niven, all of New York. Charles H. Swan, 214 Broadway, New York, is the Secretary. Books for subscriptions to the capital stock have been opened in New York and Jersey City. The engineer, Thomas H. Clark, in his report on this project has recommended that the termini of the bridge be at Seventy-first street, in New York, and at a point in New Jersey opposite that street, with an approach to the New York end by means of a viaduct starting at Broadway and Thirty-eighth street. The bridge is to have six tracks, two for passenger traffic, two for freight and two for rapid transit, with no footpath, and, in accordance with the regulations of the War Department, is to be at least 150 ft. above high water. It will be 2,200 ft. long, and cost, exclusive of approaches, between twelve and fifteen million dollars. The company will, it is reported, have \$1,300,000 with which to begin work, of which \$300,000 has been subscribed in New York City and \$1,000,000 is to be contributed by a syndicate of New Jersey Germans.

Prairie Lea, Tex.—An iron bridge is reported to be built across the San Marcos River at Prairie Lea.

Richland, N. J.—Workmen are building an iron bridge at Richland, where the Philadelphia & Seashore and West Jersey railroad tracks intersect.

Richmond, Va.—W. E. Cutshaw has prepared plans for a \$75,000 viaduct to be constructed on Broad street. It is stated the Barton Heights Co. will build a viaduct to cost \$50,000 to connect Barton Heights with Richmond.

Salem, N. C.—A \$12,000 bridge will, it is reported, be built across Wacovia Brook, near Salem, by the Winston-Salem Land & Improvement Co.

San Francisco, Cal.—It is proposed to erect a steel bridge over the channel at Sixth street, at a cost of \$26,453. R. W. Gorrill is the engineer in charge.

Shenandoah, Va.—The West Shenandoah Land Co. has let the contract for the construction of an iron bridge over the Shenandoah River to the Pittsburgh Bridge Co., of Pittsburgh, Pa., for \$15,000.

Toronto, Ont.—The City Engineer of Toronto is calling for tenders for the erection of the masonry and steel-work of the Dundas street bridges.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Eastern Illinois, quarterly, 1½ per cent. on the preferred stock, payable July 1.

Chicago & Northwestern, quarterly, 1½ per cent. on the preferred stock; and semi-annual, 3 per cent., on the common stock, both payable June 28.

Chicago, Rock Island & Pacific, quarterly, one-half of 1 per cent., payable Aug. 1.

Cleveland, Cincinnati, Chicago & St. Louis, quarterly, 1½ per cent. on the preferred stock, payable July 1; and semi-annual, 1½ per cent. on the common stock, payable July 10.

Connecticut River, quarterly, 2 per cent., payable July 1.

Lehigh Valley, quarterly, 1½ per cent., payable July 15.

Manhattan (Elevated), quarterly, 1½ per cent., payable July 1.

New York & Harlem, semi-annual, 4 per cent., payable July 1.

Pennsylvania & Northwestern, semi-annual, 2½ per cent., payable July 10.

Vermont & Massachusetts, annual, 6 per cent.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Canada Southern, annual, St. Thomas, Ont., June 23.

Chicago Junction Railways & Union Stock Yards Co., annual, Chicago, Ill., July 2.

Cincinnati, Hamilton & Dayton, annual, Cincinnati, O., June 16.

Georgia Pacific, special, Birmingham, Ala., June 20, to authorize the execution of an equipment mortgage.

Hudson Tunnel, special, Mills Building, New York City, June 30, to consider a proposed issue of bonds.

Morris & Essex, annual, Hoboken, N. J., June 24.

Northern of New Jersey, annual, Englewood, N. J., June 17.

Ogdensburg & Lake Champlain, annual, Ogdensburg, N. Y., June 17.

Oregon Improvement Company, annual, Seattle, Wash., June 15.

Oregon Railway & Navigation Company, annual, Portland, Or., June 15.

Philadelphia, Wilmington & Baltimore, special, Wilmington, Del., June 19, to consider the sale of the New Castle branches and the New Castle Cut-off to the Delaware R. R.

Rutland, annual, Rutland, Vt., June 18.

Salt Lake & Eastern, annual, Room 35, Opera House Building, Ogden, Utah, June 24.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The American Railway Master Mechanics' Association will hold its annual convention at the Stockton

Hotel, Cape May, N. J., beginning at 9 a. m., June 16. Members wanting rooms reserved are requested to apply to the Secretary.

The International Association of Car Accountants will hold its next meeting at Denver, Col., June 16.

The American Society of Mechanical Engineers will hold its next meeting at St. John's Hall, Masonic Temple, Providence, R. I., June 16 to 19.

The New England Railroad Club meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The New York Railroad Club meets at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.

The Southern Railway Club holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The Northwest Railroad Club meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The Northwestern Track and Bridge Association meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The American Society of Civil Engineers holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The Boston Society of Civil Engineers holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month.

The Western Society of Engineers holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The Engineers' Club of St. Louis holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the South holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The Denver Society of Civil Engineers and Architects holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas hold regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The American Society of Swedish Engineers holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The Engineers' Club of Minneapolis meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The Canadian Society of Civil Engineers holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The Technical Society of the Pacific Coast holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

The Association of Civil Engineers of Dallas meets on the first Friday of each month at Dallas, Tex.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m.

The American Society of Swedish Engineers holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The Engineers' Club of Minneapolis meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The Canadian Society of Civil Engineers holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The Technical Society of the Pacific Coast holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

Engineering Association of the South.

A regular meeting of the Engineering Association of the South was held at the Y. M. C. A. rooms, Nashville, Tenn., at 8 p. m. Thursday, June 11. The programme comprised a paper entitled "Some Notes on Mining Operations in the Sewanee Coal Seam," by Mr. J. J. Ormsbe, Superintendent of the Whitwell mines of the Tennessee Coal, Iron & Railroad Co., and a paper on "Street and Highway Economics," by Mr. J. M. Heiskell, Assistant Engineer, Memphis Bridge, Memphis, Tenn.

National Association of Local Freight Agents

The fourth annual session of the National Association of Local Freight Agents was held at the Lafayette Hotel, Philadelphia, June 9. The President of the Association is Mr. G. B. Rathbone, of the Nickel Plate Line. The Lehigh Valley ran a special train from Buffalo, the Pennsylvania takes the members and their wives around Philadelphia, and the Reading takes them to Atlantic City.

Technical Society of the Pacific Coast.

A regular meeting of the Technical Society of the Pacific Coast was held on June 5 at the rooms of the Society, Academy of Sciences Building, No. 819 Market street, San Francisco. Professor Soule read a paper prepared by Mr. Jerome Newman, Civil Engineer, entitled "Bridge Analysis."

PERSONAL.

—Mr. A. C. Bassett, Manager of the Coast Division of the Southern Pacific, has resigned, and the division has been merged with other lines of the company.

—Mr. J. S. Tebbets has resigned the general management of the Union Pacific Coal Company. Mr. Tebbets was formerly General Passenger and Ticket Agent of the Union Pacific.

—Mr. William McGibney, Eastern Passenger Agent of the Louisville & Nashville, died in New York City on June 4 of pneumonia, aged 47 years. He had been Eastern Passenger Agent since 1873.

—Mr. W. M. Apps has resigned his position as Master Car Builder of the Western of Alabama at Montgomery, and will go to Chicago to enter the service of one of the Chicago roads in a similar capacity.

—Mr. E. B. Wall, Superintendent Motive Power Pennsylvania lines west of Pittsburgh, Southwest system, will be married at Columbus, O., on June 24, to the daughter of Mr. John G. Mitchell, of that city.

—Mr. Benjamin Thomas, formerly General Superintendent of the Erie, who has been with the Chicago & Atlantic for several years as General Superintendent and later with the Chicago & Western Indiana as Vice-President and General Manager, has been made President of the latter road.

—Mr. L. B. Jackson, Chief Engineer of Construction of the Chesapeake & Ohio Road, has tendered his resignation, and Mr. H. Frazier, Superintendent of the Cincinnati and Huntington Division, has been promoted to the position. Mr. Jackson was formerly Chief Engineer of the Elgin, Joliet & Eastern.

—Mr. W. F. Shellman, Traffic Manager of the Central of Georgia and its operated lines, has resigned, the department having been consolidated with the traffic department of the Richmond & Danville system. For the present Major Shellman will continue as the representative of the road in the Southern Railway and Steamship Association.

—Mr. C. F. Wilson, for some time General Master Mechanic of the Chicago, Rock Island & Pacific, has been appointed Superintendent of Motive Power and Equipment to fill the vacancy caused by the death of Mr. B. K. Verbyck, Master Car Builder. Mr. Wilson succeeded Mr. T. B. Twombly as General Master Mechanic of the road and was formerly Assistant Master Mechanic.

—Mr. F. W. Dunn, Superintendent of the Seattle, Lake Shore & Eastern, has resigned, after serving in that capacity since April, 1890. Mr. Dunn has had nearly 21 years' experience in railroad business. He has now become interested in mining operations in western Washington, and he will devote his attention to that business. He was engaged for ten years, from 1863, on the Lake Shore & Michigan Southern. Among other positions he has been Superintendent of Telegraph of what is now the Chicago & Grand Trunk; Managing Director and Superintendent of the Salt Lake & Western and of the Nevada Central; Division Superintendent of the Louisville & Nashville, and Superintendent of the Birmingham & Bessemer roads at Birmingham.

—Mr. Chauncey Vibbard, the famous railroad man, died June 5, at Macon, Ga., in the eightieth year of his age. He was born in Galway, N. Y., and began business life at Albany. Then he went south for two or three years, and, finally, in 1836, obtained the position of Chief Clerk of the Utica & Schenectady road. In this office he revealed great energy and ability, and is credited with revolutionizing the system of freight and passenger traffic. When the New York Central road was formed, he was appointed General Superintendent, a position which he held until 1865, again displaying remarkable talents of organization. At the same time he engaged in extensive business operations in the South, making a large fortune, part of which was lost at the outbreak of the war. He was elected to the Congress which met in July, 1861. In 1862, at the request of the Secretary of War, he consented to fill the position of Director and Superintendent of Military Railroads of the United States. He refused a re-election to Congress after the war, retiring into private life and devoting himself to his many business interests, one of which was a well-known line of steamboats on the Hudson River between New York and Albany. He leaves two sons and a daughter.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio.—W. A. Pratt, Engineer of Maintenance of Way of the Pittsburgh Division, has been transferred to the Philadelphia Division, in a similar capacity. He will be succeeded by C. C. Elwell, now Engineer of Maintenance of Way of the latter division.

Baltimore & Potomac.—At the annual meeting in Baltimore, June 4, the following directors were elected: Frank Thomson, B. F. Newcomer, W. T. Walters, R. D. Barclay, Samuel Cox, Jr., Francis T. Smith, John Cassels. Mr. Cassels takes the place in the board of the late George Small. The officers elected were: Oden Bowie, President; Frank Thomson, Vice-President; John S. Leib, Treasurer; James P. Kerr, Secretary.

Barre.—At the meeting of the stockholders held at Barre, Vt., May 28, the following Directors were elected: W. A. Stowell, Montpelier, Vt., and A. D. Morse, F. W. Stanyan, E. L. Smith, J. Trow, Barre, Vt. A. D. Morse elected President, W. A. Stowell Vice-President and was F. W. Stanyan Clerk and Treasurer.

Burlington & Missouri River.—Master Mechanic W. Fuller, who has been with the Burlington & Missouri

River road for the past 15 years, has resigned and been succeeded by Robert Balance.

Chicago & Indiana (Coal).—At the annual meeting of the road at Chicago last week, G. W. Saul was elected a director in place of A. C. Daniel, and O. S. Lyford was re-elected President.

Chicago & Northwestern.—At the annual meeting of the stockholders last week, the following directors were elected for a term of three years: David F. Kimball, Chauncey M. Depew, Samuel F. Barger, Albert Keep, M. L. Sykes and James C. Fargo. The first five succeed themselves, while Mr. Fargo was chosen to fill the vacancy caused by the death of A. J. Dulman. Albert Keep was elected Chairman; Marvin Hughitt, President; M. L. Sykes, Vice-President, Secretary and Treasurer, and S. O. Howe and J. B. Redfield, Assistant Secretaries and Assistant Treasurers.

Chicago, Rock Island & Pacific.—C. F. Wilson, for some time General Master Mechanic of the road, has been appointed Superintendent of Motive Power and Equipment to fill the vacancy caused by the death of B. K. Verbyck. A. H. Monkhouse, Assistant Master Mechanic and Assistant Master Car Builder, has been transferred to Horton, Kan. John Black has been appointed Foreman of Machinery and Master Mechanic in charge of the Illinois Division at Chicago.

Chicago, St. Paul, Minneapolis & Omaha.—At a meeting of the stockholders held at Hudson, Wis., last week the following directors were chosen for three years: M. L. Sykes, New York; John M. Whitman, Chicago; John A. Humbird, Hudson, Wis., and James H. Howe, St. Paul, Minn.

Chicago & Western Indiana.—At the annual meeting in Chicago, Ill., June 2, V. T. Malott was elected chairman of the board; B. Thomas, President and General Manager; M. J. Clarke, Vice-President, and J. E. Murphy, Treasurer. Samuel Thomas was also elected director, vice W. L. Breyfogle.

Cleveland, Cincinnati, Chicago & St. Louis.—W. M. Greene, General Manager, having resigned, Joseph H. Ramsey, Jr., Assistant to the President, has been appointed General Manager to succeed him. J. A. Barnard, late Assistant General Manager at Indianapolis, has been appointed General Manager of the Peoria and Eastern Division.

Duluth & Iron Range.—The annual meeting of the Company was held in Duluth, June 9. The officers elected were: H. H. Porter, Chairman; H. R. Bishop, President and H. R. Bishop, H. H. Porter, R. P. Flower, Marshall Field, Benjamin Brewster and C. P. Coffin, Directors.

Duluth, South Shore & Atlantic.—The regular meeting of the stockholders of the company was held at Marquette, Mich., on June 4, when the following directors were elected: T. N. Finney, Minneapolis; Sir George Stephen, Sir Donald Smith and W. C. Van Horne, Montreal; J. W. Sterling, Walter Watson, T. W. Pearsall, W. A. C. Ewen, Samuel Thomas and Calvin S. Brice, all of New York, and W. F. Fitch, Marquette.

Elkhart & Western.—At a meeting of the officers and directors at Goshen, Ind., last week, the following officers were chosen: H. E. Bucklen, Chicago, President; E. C. Bickler, Elkhart, Secretary and Manager, and Stratford Maxom, Auditor.

Fort Worth & Rio Grande.—Richard F. Whalen, formerly Master Mechanic of the St. Louis & Hannibal, has been appointed Master Mechanic of this road, with headquarters at Fort Worth, Tex.

Genesis & Obed River.—The company held its annual meeting June 1, at Crossville, Tenn. The following directors were elected: G. C. Stevens, G. W. Youngs, S. N. Vance, Hon. C. A. Seaver and Capt. Lina Beecher. The following officers were chosen: President and General Manager, Capt. Lina Beecher; Vice-President and General Superintendent, G. W. Youngs; Secretary and Treasurer, Hon. C. A. Seaver, and Chief Engineer, M. C. Massie.

Great Northwest Central.—The annual meeting of the company was held at Ottawa, Ont., June 3, when the following Board of Directors was elected: President, J. Codd; Vice-President, J. W. Robinson, Toronto; Secretary, A. Codd; Senator Clewlow, Ottawa; D. McMichael, Toronto; C. B. Stevens, London, Eng., and H. F. Codd.

Illinois Central.—M. R. Spelman has been made General Southern Agent of the road at New Orleans, vice S. B. McConico.

Johnson City & Greensboro.—The following officers have been elected: F. A. Stratton, President; S. F. Harper, Vice-President; E. E. Davis, Secretary, and H. E. Colton, Chief Engineer. The headquarters are at Johnson City, Tenn.

Kalamazoo, Allegan & Grand Rapids.—The directors have elected the following officers: J. H. Wade, Jr., President; D. P. Ellis, Vice-President; C. P. Leland, Secretary; W. S. Jones, Treasurer.

Maine Shore Line.—At a meeting held at Machias, Me., June 3, the following directors were elected: S. D. Leavitt, Eastport, Me.; L. G. Downes, A. M. Nichol, J. S. Clark, Calais, Me.; S. N. Campbell, W. M. Nash, Cherryfield; J. K. Ames, Machias, Me.; Austin Harris, A. F. Kingsley, East Machias. The board elected Gen. S. D. Leavitt, President, and A. E. Hamlin, Clerk.

Mexican Northern.—The stockholders held their annual meeting at the offices of the company in New York City on June 2, and elected the old Board of Directors.

Michigan Central.—J. R. Dutton has been appointed Purchasing Agent of this company, with office at Detroit, Mich., vice Allan Bourn, resigned.

Montpelier & Wells River.—The stockholders of the road met at Montpelier, May 20. D. R. Sortwell and A. F. Sortwell, Barre, Vt.; Joel Foster, S. C. Shurtliff and J. W. Brock, Montpelier, Vt., were elected directors. The directors elected D. R. Sortwell, President; A. F. Sortwell, Vice-President; Joel Foster, Clerk and Treasurer; W. A. Stowell, General Superintendent, and F. W. Morse, General Freight and Passenger Agent.

Pennsylvania.—T. R. Browne, formerly in the office of the Mechanical Engineer at Altoona, has been appointed Assistant Master Mechanic of the Juniata shops, with headquarters at Altoona, Pa.

Puget Sound Shore.—This company and the Columbia River & Eastern have been incorporated in Washington by J. R. McDonald, A. H. Anderson, A. M. Hagen, J. C. Day, of Missouri, and Josiah Pierce, of North Dakota. J. Pierce is President of both roads; J. R. McDonald, Seattle, Wash., is Vice-President of the Columbia River

& Eastern, and A. H. Anderson, Seattle, is Vice-President of the Puget Sound Shore.

Red River & Ouachita Timber Belt.—The company has been incorporated by Francis M. Hanks, Jasper W. Whittington, Thomas W. Stinson, William B. Simpson, James Vaughan and Alex. R. Thompson.

Richmond & Danville.—The following officers of this company have had their authority extended over the lines of the Central of Georgia, under the lease of that road to the Georgia Pacific: W. H. Green, General Manager; Sol Haas, Traffic Manager; J. P. Minetree, General Purchasing Agent; R. D. Wade, Superintendent of Motive Power, and James L. Taylor, General Passenger Agent. Cecil Gabbett has been appointed General Superintendent, with office at Atlanta, Ga.; A. W. Gibbs, formerly Superintendent of Motive Power, has been appointed Assistant Superintendent of Motive Power; George A. Whithead, formerly General Freight Agent, and E. T. Charlton, formerly General Passenger Agent of the Central of Georgia, have been appointed Freight Agent and Passenger Agent respectively, with offices at Savannah. W. J. Craig has been appointed Passenger and Freight Agent of the Port Royal & Augusta and Port Royal & Western Carolina, with office at Augusta, Ga.

Rutledge & Julian.—The stockholders met in Rutledge, Ala., June 1, and re-elected the old officers and Board of Directors, as follows: President, B. A. Walker; Vice-President, F. M. Cody; Secretary, W. C. Davis; Treasurer, E. F. Dyer; Directors, W. R. Tomlin, J. D. King, I. H. Parks, I. S. Johnson, M. W. Rushton, J. T. Stephens and E. F. Dyer.

St. Louis & Hannibal.—J. K. Tremain has been appointed Master Mechanic to succeed R. F. Whalen, resigned.

Seattle, Lake Shore & Eastern.—J. M. Hannaford, of the Northern Pacific, has been appointed Traffic Manager. G. W. Dickinson has been appointed Superintendent, vice F. W. Dunn, resigned. Mr. Dickinson will have exclusive control of the traffic and operation of the road. The Chief Engineer, Secretary, Cashier and Auditor will report as heretofore to the President. I. A. Nadeau has been appointed Assistant Superintendent.

Tamaqua, Hazleton & Northern.—The following are the directors: A. A. McLeod, Philadelphia, Pa., President; Albert H. O'Brien, James M. Landis, Charles C. Midwood, Wm. B. Scott, Daniel Jones, Chas. H. Quarles, W. R. Taylor and Roswell Westen.

Union Pacific.—John McCormick, of Denver, Col., has been appointed Division Superintendent, with office at Trinidad, Col. R. R. Sutherland, as Superintendent of the Nebraska Division, with headquarters at Omaha, succeeds Frank H. Keeshean, assigned to other duties. J. A. Foley has been appointed Superintendent of the Nebraska Division, with headquarters at Lincoln, vice R. R. Sutherland, transferred.

Utah Central.—The stockholders, at a recent meeting in Salt Lake City, elected these officers: President, Joseph Richardson; Vice-President, John W. Young; Second Vice-President, LeGrande Young; Secretary, Junius F. Wells; General Superintendent, J. H. Young.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Adirondack & St. Lawrence.—The former Herkimer, Newport & Poland, which now forms part of this road, has been changed to standard gauge between Herkimer and Poland, N. Y., a distance of 17 miles. The new rails were laid last Saturday and standard-gauge trains are now running over the road as far as built.

Baltimore & Lehigh.—The proposed improvements and extensions of the Maryland Central to form a connection with the Peach Bottom road in making the continuous line to be known as the Baltimore & Lehigh Railroad, will cause several changes in the existing road in Harford County, Md. The most important of these is known as the Twining Valley cut-off. The company will build five miles of new road from Baldwin Station, on the present road, to Sharon Station, near Forest Hill. The construction of this line will shorten the route five miles.

Baltimore & Ohio.—The surveys which have been made for a branch from Linden, on the Metropolitan branch, west of Washington, D. C., through Montgomery County south to the Potomac River, are to be continued, according to press dispatches, south of the Potomac River to Fredericksburg and to Orange C. H., Va., to form a connection at one of these points with the Richmond Terminal system. It is said that the grading will begin very soon. The line is projected to cross the Potomac by a bridge near Great Falls. It will be about 10 miles long north of the Potomac and about 50 miles parallel to the river to Fredericksburg.

California & Nevada.—The contractors have commenced to lay the track on the extension to Walnut Creek. The grading on the nine miles to that point has been completed by Grant Brothers, who are also doing the tracklaying. The extension is from the present terminus at Orinda Park, on the Southern Pacific, near Oakland, northwest through Contra Costa County. The line now being built is of standard gauge, and the main line from Oakland is to be changed to standard gauge as soon as practicable. It is expected to have trains running to Walnut Creek early in August.

Central of Georgia.—Since the Savannah, Griffin & North Alabama was purchased by this company last November about 25,000 new cross-ties have been put in and new 63-lb. rails are being laid between Carrollton and Griffin, Ga., 60 miles. Less than five miles of the new rails remain to be laid. The branch is to form part of a new route of the Central between Macon and Chickamauga.

Chesapeake & Ohio.—The branch under construction from the main line near Covington through the Warm Springs Valley, in Bath County, Va., will, it is reported, be completed this month. The line will be in operation in July. Most of the grading was finished this spring and the tracklaying was begun in the latter part of April. The line is about 17 miles long, and passes through Hot Springs and Healing Springs to Warm Springs, which is to be the terminus for the present.

Chicago, Union City & Indianapolis.—The company has been incorporated at Indianapolis, with a capital stock of \$100,000, to build the proposed line from Union City to Huntington, Ind., 60 miles. The directors are F. H. Allison, J. J. Shafer, J. C. Fawcett, of Louisville; G. L. Danforth, C. W. Pierce, A. Lupton, J. J. Lafayette and G. W. Patchell.

Columbia River & Eastern.—The articles of incorporation for this company were filed in the state of Washington last week with those of the Puget Sound Southern road. The company proposes to build a road from a point on the Columbia in Wahkiakum County, across the Cascades to some point on the eastern boundary, where connection can be made with the railroad of Idaho. Beginning near the mouth of the Columbia River it will follow that river for some distance, and then extend northeasterly to timber lands owned by the incorporators. The capital stock is \$5,000,000. The offices are in the Haller building, Seattle.

Coos Bay Terminal.—The company has been chartered in Oregon to construct a road beginning at a point on the east side of Coos Bay and extending westerly across to the large island in Coos Bay, and around the southern and western shore of the island, and thence north to Glasgow. The capital stock is \$250,000. C. W. Tower, H. A. Moss and L. C. Garrigus are the incorporators.

Deer Creek & Susquehanna.—It is stated that arrangements have been made to resume the construction work on this road this summer. It will be a branch of the Maryland Central, and will extend from a point on its main line near Bel Air east to the Susquehanna River near Stafford, Md. The line is about 16 miles long and about seven miles of the distance was graded over a year ago.

De Kalb, Aurora & Eastern.—The engineers have recently completed a preliminary survey from De Kalb, on the Chicago & Northwestern, southeast to Sugar Grove, on the Chicago & Iowa road, a short distance east of Aurora, Ill. The line will be about 25 miles long, and the eastern terminus will be at Aurora, or near that town, on the Geneva branch of the Chicago, Burlington & Quincy, or on the Chicago & Iowa, between Hinckley and Aurora.

Dutchess County.—Several members of the Philadelphia syndicate which is interested in the Poughkeepsie Bridge Co. have guaranteed a subscription of \$200,000 to the capital stock of this company if \$100,000 additional is subscribed in Poughkeepsie or the towns along the line. This \$300,000 will be sufficient to complete the road from Poughkeepsie to the connection with the New York & New England at Hopewell Junction, N. Y., a distance of 12 miles. Considerable cutting and filling has already been done on the line, and it is stated that the road can be placed in operation within 90 days from the time work is resumed.

Elkhart & Western.—It is said that the company arranged at its annual meeting last week to complete the road between Elkhart and Mishawaka, Ind., where connection will be made with the Grand Trunk. The distance is about 11 miles and some work has already been done on the grading near Elkhart. E. C. Bickie, of Elkhart, is General Manager.

Exeter & Amesbury.—The directors of the Concord & Montreal have agreed to have their engineers make a survey of this road, and, if the report is favorable, to build the line or aid in its construction. The line is projected from Epping, on the Concord & Montreal, south to Exeter, N. H., 8 miles, and to Amesbury, Mass., on the Boston & Maine, near Newburyport. The route which has been surveyed by the incorporators is said to be a favorable one, and the estimated cost of construction is \$13,000 per mile for the 12 miles. J. J. Bell, of Exeter, is President.

Florida, Georgia & Western.—About 300 men are employed on construction work on the 20 miles of the road west of Tallahassee to Wacissa, Fla. The grading has been finished on six miles of this section ready for laying the cross-ties. A preliminary survey is being made by R. M. Williams, from Tallahassee south to Charlotte Harbor. The engineers are now at Brooks ville, having surveyed through Wacissa, Perry, Steinhatchie, Albion and Dunnellen. The engineers expect to reach Tampa about June 20 and Charlotte Harbor early in July. The line will be very easy to construct, as the country is almost level for the greater portion of the distance. There will be several bridges, one across the Anclote River, about 150 ft. long; at the Suwannee River, 400 ft. long, and at the Withlacoochee, 200 ft. long. C. W. McLean is President and George S. Daniels, of Tallahassee, is Secretary and Treasurer.

Florida Roads.—Bills favorably introduced to incorporate the following railroad companies have passed the legislature: The Blue Springs, Orange City & Atlantic, Brookville & Lacoochee, Tavares, Atlantic & Tampa, Lakeland, Mohawk & Tavares, with a land grant; Lake City & Albion, and Homosassa & Withlacoochee; also to extend the time for completing the Florida, Alabama & Atlantic. A bill has been introduced to grant lands to the Manatee & Sarasota.

Fort Scott & Eastern.—A mortgage on this branch of the Missouri Pacific, which is to extend through Vernon, Bates and Henry counties, in Missouri, has been recorded at Clinton. The mortgage is for \$15,000 per mile. The road has been built only from Fort Scott, Kans., east to Rich Hill, Mo., 25 miles. It is proposed to extend it northeast to Tifton, Mo., near Sedalia, a distance of 100 miles. The line will practically parallel the Missouri, Kansas & Texas between Fort Scott and Sedalia.

Honeoye Valley.—Broadhead & Hickey, of Easton, Pa., were awarded a contract last week for grading and laying track on this branch road from Rochester south to a connection with the Buffalo & Geneva, in Monroe County, near Rushville, N. Y. B. P. Smith, of Rochester, N. Y., has the contract for the masonry work in Rochester, amounting to about 6,000 yards. There will be some heavy fills on several sections. The line is a branch of the Lehigh Valley and is to be completed early in November. It will be 12 miles long. The contractors for the earth-work, are to begin construction at once.

Jacksonville, Tampa & Key West.—The change of gauge on the first section of the Florida Southern Division is to be completed within 30 days. This 12 miles between Bartow and Fort Meade, Fla., is the only part of the line that will be made standard gauge at present. It is proposed to make the entire Charlotte Harbor Division a standard gauge to Punta Gorda, but this work will not be completed until later in the year.

Johnson City & Greensboro.—The surveys are to begin in a few days for this road, between Johnson City, Tenn., and Greensborough, N. C., via the iron lands near Cranberry. H. E. Colton is Chief Engineer.

Little Kanawha Valley.—A charter was granted to this company in West Virginia last week. It proposes to build a road from Parkersburg up the Little Kanawha River through the counties of Wood, Wirt, Calhoun, Gilmer and Braxton to Hacker's Valley, in Webster

County. The office is to be at Parkersburg. The capital stock is \$20,000. The incorporators are: J. Henry Fischer, Edward McCreary and William Bentley, of Parkersburg, and Senator M. R. Lowther, of Elizabeth, Wirt County.

Louisville & Nashville.—The last of the track on the Cumberland Gap branch of this road to Norton, Va., has been laid and trains are to begin running this week. The Norfolk & Western was completed to Norton some time ago, and the Louisville & Nashville branch completes a new line between Norfolk and Louisville.

Mattoon & Charleston.—This company was incorporated in Illinois, June 2, with a capital stock of \$200,000. The road is projected to extend from Mattoon easterly to Charleston, Ill., a distance of 10 miles.

Michigan Central.—A belt line will, it is reported, be built by this company around Jackson, Mich., to handle all the freight traffic. The main line now runs through the town.

Montpelier & Wells River.—The road is being double-tracked from Montpelier to Barre Junction, Vt., on account of the increasing business.

Moon River.—The construction of this line is being rapidly pushed from Groveton, Pa., on the Pittsburgh & Lake Erie, near Pittsburgh, to coalfields a few miles from that town.

New Roads.—The owners of several lumber mills in Siskiyou County, in northern California, propose to build a narrow-gauge road to their lumber mills from a connection with the Southern Pacific at Lower Soda Springs, at the base of Mount Shasta. The road will be 25 miles long, and it is estimated that it can be built for \$150,000. About 8,000,000 ft. of lumber will be cut this year. The timber is spruce, sugar pine, fir, yellow pine and cypress.

Several New York bankers who have become interested in some of the mines at Castle, Mont., are said to have agreed to construct the proposed road from Helena southeast to Castle, Mont., if the right of way is secured, and if subsidies are voted by the other owners of mines. A survey has been made by Mr. Davis, an engineer of New York. The line will be about 60 miles long.

The New York Loan & Trust Co. has recently placed on record in Sydney, C. B., a mortgage for \$2,000,000 in connection with the construction of the proposed road from Port Hawkesbury to Louisburg and from Louisburg to Sydney, C. B. Application will be made for the usual subsidies, and it is stated that the company will start to build the road within a short time.

The Avoynelles Construction Co., Limited, has been organized to build the proposed road from Bunkle via Evergreen to Hamburg, La., a distance of about 15 miles. The office of the company is at Evergreen, La.

Northern Pacific.—A branch about three miles long is to be built through Pine County, Minn., to the lumber mills of the Huntress & Brown Lumber Co. The line has been surveyed from the main line near Hinckley to the south shore of the Pokegame Creek.

The contractors are pushing work on the new extension from Missoula, Mont., north to Wallace, Idaho, in the center of the Coeur d'Alene district. The line will be 124 miles long, and will be in operation in the fall to Wallace.

North Mexican Pacific.—A. M. Tenney, of Colonia Diaz, Mex., has taken the contract for grading the line from a point nine miles south of Palomas to Corralitos, Mex., a distance of 90 miles, the work to be completed by Sept. 15 next.

Ohio & West Virginia.—The charter for this company was filed in Ohio last week by stockholders of the Zanesville & Ohio River road. That company is to be reorganized and the name changed as above. Terminal roads are to be built at Harmer and Zanesville under the new charter. The road now extends from Zanesville to Harmer, opposite Marietta, 74 miles, with a branch from Shawnee Junction to Shawnee, 28 miles.

Oregon, Washington & Idaho.—The company has been formed to construct railroad lines along the Columbia and Snake rivers in Oregon and Washington and to operate steamship lines. The capital stock is \$2,000,000. The headquarters of the company will be at Union, Or. The incorporators include C. H. Dodd, A. S. McAllister, W. P. Gray, J. W. Smith, F. J. Parker, J. H. Day, H. W. Scott, E. J. Hughes, J. J. Fisher, A. H. Breyman, I. W. Case, J. H. Gray, W. H. Brewster, J. J. Brown and J. J. Maddock.

Pajaro Valley.—B. McMahon & Son, of San Francisco, have received the contract for the construction of the extension from Moro Cojo to Salinas, Cal. Work is to be completed by August.

Parry Sound.—The annual meeting of the shareholders was held at Parry Sound, Ont., last week. The engineer reported that 25 miles of the line had been cleared, 14 miles graded and the trestle and bridge work completed. Ties for 20 miles were on hand, and rails for 11 miles. Nine miles of track has been laid and five miles ballasted. The first section of 10 miles will be completed in June and the second 10-mile section by Sept. 1.

Pennsylvania.—Surveys have been made for a branch line from Pottsville to the company's coal lands near Minersville, in Schuylkill County, Pa., and it is said that most of the necessary property has been secured. The purpose is to develop the coal lands.

A survey is being made from New Lisbon, N. J., on the Philadelphia & Long Branch road, southeast in a nearly direct line to the Atlantic coast at Manahawkin, for a branch to give a more direct route from Philadelphia to points on the Tuckerton road.

Perry County.—A new survey is being made for the extension from New Bloomfield, southwest to Landersburg and Green Park to Loysville, Pa. The extension will be about 12 miles long through Perry County.

Philadelphia & Reading.—The contract has been let for the laying of the third track from Phoenixville to Perkiomen Junction, Pa., 2½ miles. In this contract a large stone bridge to span the Perkiomen Creek is included.

Portland & Rumford Falls.—The final survey is now being made for the proposed extension from Gilbertville west to Rumford Falls, Me., a distance of 15 miles, by Parker Spofford. The company has applied to the Railroad Commissioners of Maine for approval of the location of the extension near Gilbertville.

Port Townsend Southern.—Tracklaying has been commenced on the extension of the line south of Port Townsend, Wash., from Lake Hood to Quilcene, on Hood Canal, eight miles. J. H. Smith, of Portland, Ore., has the contract.

Puget Sound Southern.—The company was chartered in Washington by J. R. McDonald, of Seattle, and other incorporators of the Columbia River & Eastern. The road is to extend from a point on Puget Sound, near the mouth of the Nisqually Sound, in Thurston County, Wash., southeasterly to the Cascade Mountains and to a connection with the roads in Idaho. The road is to be built to reach the timber in that part of Washington. Vice-President McDonald says that it is proposed to extend the line across the mountains by the Cispus Pass, and across the state into Idaho, keeping generally to the south of the Northern Pacific and near the Columbia River. The line will extend through Klickitat County, and probably through the Walla Walla country. The two roads will connect on the western side of the mountains and develop a rich section of new timber and mineral country.

Red River & Ouachita Timber Belt.—This company has been incorporated in Louisiana by F. M. Hanks, J. W. Whittington and others with a capital stock of \$50,000. The proposed road is to extend from the Red River, in Bossier Parish, La., in a northeasterly direction to the Arkansas line.

Rio Grande Southern.—A mortgage for \$300,000 in favor of one of the New York trust companies has been recently recorded in Colorado. It is on the constructed portion of the road south of Dallas, Col.

Roanoke & Southern.—The contractors have recently begun to lay the track on the northern division of the road between Martinsville, the present terminus, and Roanoke, Va. The division is about 60 miles long and was put under contract this year.

Saginaw, Tuscola & Huron.—The rails for the standard gauging of the 67 miles of this road from East Saginaw, Mich., have been delivered along the line and the track is to be laid this month. The road will be in operation as a standard-gauge line about July 1. About three miles of track is being laid a day.

Silver City & Northern.—The contractors have completed the construction of about half the road between Whitewater and Georgetown, N. Mex. The track has been laid from Whitewater, on the Atchison, Topeka & Santa Fe, east to Fort Bayard, about 12 miles. The work is making good progress from the end of track north to Hanover, a distance of six miles. From the latter town the road is to extend to Georgetown, six miles, and thence to Nuimbras, a distance of 18 miles. The contractors are Frontman, Smith & Baird and Davidson & Worthen. The road is being built principally to develop mines in Grant County in southwestern New Mexico.

Silver Creek & Dunkirk.—The construction of this line, which is a branch of the Lake Shore & Michigan Southern, has been unavoidably delayed on account of the difficulty in procuring the right of way. The commissions appointed to condemn the right of way are expected to report in a few weeks. The branch is to be built between Silver Creek and Dunkirk, N. Y., eight miles, as a low-grade cut-off. It is more economical to build the new line than to reduce the grade on the present location as low as required.

Skowhegan & Norridgewock.—The directors of this road have appointed committees to confer with the officers of the Maine Central and Somerset roads regarding the construction of the line. Both these companies have made propositions to operate the road under certain terms. The Maine Central offers to guarantee \$75,000 of the four per cent. bonds of the new company, and lease the road for a term of years. The Somerset road agreed to build the road if a subsidy of \$15,000 was raised, but the officers now state that they will make a new proposition. The road is to be built along the Kennebec River from Skowhegan, on the Maine Central, to Norridgewock, five miles.

South Ontario & Pacific.—The Canadian Pacific, of which this line is a branch, has had a bill introduced in the Dominion Parliament amending the charter of the road in various respects. The bill provides that the company may construct a line from a point on the Ontario & Quebec near Woodstock, Ont., east about 50 miles to Hamilton, and also to a point on the Niagara River; a line from Ontario or from Cooksville, a few miles west of that town, southwest through Hamilton; also a branch from the first line, via Embro, in Oxford County, and St. Marys, to a point on Lake Huron between Bayfield and Kincardine.

Southwestern Pacific.—This company filed articles of incorporation this week at Little Rock, Ark. The capital stock is \$3,000,000. The road will commence at Argenta, cross the Arkansas River to Little Rock, thence to a point at or near Hartford, in the southwestern part of Sebastian County, on the state line, passing through the counties of Pulaski, Saline, Perry, Yell, Logan, Scott and Sebastian southward. Also a branch line from Little Rock through the counties of Pulaski, Saline and Garland to Hot Springs, thence through Garland, Montgomery and Polk Counties to Dallas, on the state line between the Indian Territory and Arkansas. The entire mileage is over 300 miles.

Stoneham.—The Boston & Maine is expected to begin the construction of this branch in a few weeks. Three routes have been surveyed, and it is stated that the line will be built from Oak Grove station, on the main line, instead of from Middlesex Falls station, as previously determined. The length of the line to Stoneham, Mass., will be 3½ miles long.

Story City, Fort Dodge & Sioux Falls.—The charter for this company will probably be filed in Iowa in a few days. The company is being formed by Hamilton Brown and others to build a road from Story City, Ia., on the Central Iowa, through Fort Dodge to Sioux Falls, S. D., crossing the survey of the Sioux City & Northwestern near Marshalltown. The line has been surveyed as far as Lehigh.

Tamaqua, Hazleton & Northern.—This branch of the Philadelphia & Reading was chartered in Pennsylvania last week. The articles of incorporation describe the route as beginning at a connection with the Catawissa road, near Lofy, in the County Schuylkill, and ending at a connection with the Delaware, Susquehanna & Schuylkill Road, near Hazleton, Luzerne County, Pa. The capital stock is \$300,000 and the length of the line will be about 10 miles.

Toledo, Ann Arbor & North Michigan.—The company will commence work on the construction of its new extension from Marion, Oscoda County, north to Mackinaw, Mich., within 10 days. It will take a couple of years to complete the work.

Western New York & Pennsylvania.—The track-laying on the Swains branch of this company is now in

progress. The grading has been practically finished from Ross' Crossing and trains will probably be running over the line in a few weeks.

Whitefield & Jefferson.—The contract for the earth-work on the extension from Jefferson has been let to Brown & Ryan, as stated last week. The members of the firm are H. H. Brown and J. K. Ryan, and they have an office at No. 61 Broadway, New York City. The extension is from Jefferson northeast to Berlin Falls, N. H., on the Grand Trunk, a distance of 17 miles. The line is to be built by the Concord & Montreal, of which the road is a branch. The capital stock of the branch was recently increased from \$300,000 to \$500,000 to provide for the construction of this extension. F. A. Merrill, of Concord, N. H., is Chief Engineer.

Wilmington, Chadbourne & Conway.—The extension to Lumberton, N. C., on the Carolina Central, will be permanently located this month. Two preliminary surveys have already been run from Butter's Mills, near Conway, northwest to Lumberton, a distance of 13 miles. The extension will cross Lumber River at two places, and the work on the bridge at Butter's Mills will be commenced next week. The first two miles is through the Big Swamp. It is proposed to cut canals through the swamp on each side of the embankment to drain the road-bed.

Wilmington, Onslow & East Carolina.—Grading will probably be commenced very soon on the extension of the line from Jacksonville northwest to Onslow, N. C., a distance of 20 miles. The work will begin at Jacksonville, the present terminus of the line.

GENERAL RAILROAD NEWS.

Central of Georgia.—The directors of the Richmond & Danville have approved the proposition of the Georgia Pacific to lease the entire system of the Central Railroad & Banking Co., of Georgia, and the documents have been duly signed. The lease is for 99 years, with seven per cent. interest guaranteed. The announcement is made that the main purpose of the lease is to reduce the expense of two separate managements, and enable them to operate more smoothly. The banking department of the Central of Georgia is not included in the lease.

Chicago & Eastern Illinois.—The annual meeting of the stockholders of the company was held in Chicago, June 7. The following statement of earnings and expenses for the 10 months ending April 30 was presented:

	1890-91.	1889-90.
Gross earnings.....	\$3,031,374	\$2,423,891
Operating expenses.....	1,510,277	1,384,115
Net earnings.....	\$1,521,097	\$1,039,776
Income from other sources.....	24,772	30,859
Net income.....	\$1,545,869	1,070,635
Interest, rental and taxes.....	899,519	891,739
Surplus.....	\$646,350	\$178,896

A dividend of $\frac{1}{2}$ per cent. on the preferred stock was declared.

Chicago & Northwestern.—The annual report for the year to March 31 shows the following results of operations. The company reports actual figures for 1889 and 1890, and partly estimated for the year ending May 31, 1891, as follows:

	1891.	1890.	Inc. or dec.
Gross earnings.....	\$27,810,716	\$27,164,837	I. \$645,879
Op. exp. and charges.....	21,134,609	22,891,302	I. 1,756,693
Balance.....	\$3,676,101	\$4,273,535	D. \$597,434
Div. and sinking fund.....	3,445,804	3,617,549	D. 201,745
Surplus.....	\$210,297	\$655,986	D. \$445,689
Surplus Western lines.....	19,540	112,456	D. 92,916
Total surplus.....	\$229,837	\$768,442	D. \$538,605

The receipts from land sales last year are not published. A semi-annual dividend of three per cent. on the common stock and a quarterly dividend of $\frac{1}{4}$ per cent. on the preferred were declared.

Erie & Genesee Valley.—The road was sold at Genesee, N. Y., last week, in the foreclosure proceedings brought by A. Frank and L. C. Woodruff, as trustees. The road was bought by the latter for \$60,000. The line extends from Mount Morris to Dansville, N. Y., 12 miles, and has been operated for many years as the Dansville Branch of the New York, Lake Erie & Western.

Evansville & Terre Haute.—The transfer-books will be closed June 18 to receive subscriptions by stockholders for the proposed increase of the capital stock, which will amount to 33 $\frac{1}{3}$ per cent. of the present capital. Stockholders also have the right to subscribe to \$1,000,000 of the five per cent. bonds at 80, which it is thought could be sold at about par. The present increase of stock is the second stock dividend that has been declared by the company, a 20 per cent. dividend payable in stock having been declared in 1884.

Georgia Pacific.—The company on June 1 leased and received possession of the railroad and steamship lines of the Central Railroad & Banking Company of Georgia, and the Richmond & Danville will operate the lines for the account of the Georgia Pacific.

Knoxville Southern.—George R. Eager this week secured judgment in the Circuit Court at Knoxville, Tenn., for a claim amounting to \$384,000 expended in the construction of the road, and which is the balance of the payments due the construction company.

Louisville & St. Louis.—Judge Allen, of the United States Court at St. Louis, has appointed C. H. Bosworth Receiver for the 17 miles of the Louisville & St. Louis road between Centralia and Driver, Ill. Charles H. Brownell foreclosed a mortgage on that portion of the road in question and asked for the receiver. The line now forms part of the Jacksonville Southeastern system.

Mexican Central.—The company reports gross earnings for April of \$591,846, an increase of \$76,582 as compared with the same month of last year, and net earnings \$222,442, an increase of \$60,572. For the four months ending April 30 the gross earnings were \$2,271,754, an increase of \$26,544 as compared with the corresponding period of last year, and net \$858,631, an increase of \$80,095.

Missouri, Kansas & Texas.—The receivers were discharged this week by Judge Brewer, of the United States Circuit Court, in Kansas City. The property will be turned over to the railroad company on July 1, a scheme of organization having been almost perfected that is satisfactory to all parties in interest. During the receivership, which began Nov. 1, 1888, the receivers have

constructed 73 miles of road and have acquired by lease 141 miles. They have added in the way of improvements and new equipment about \$4,500,000. The new bonded indebtedness bears interest at the rate of four per cent. only, as against six and seven per cent., which was paid on the old mortgage bonds. The earning capacity of the road at present is estimated in round numbers at \$9,000,000.

Nashville, Chattanooga & St. Louis.—The plan for increasing the stock of the company is understood to be as follows: The company will issue \$3,000,000 of new stock, and offer it to the present holders at \$50 per share. The present stock outstanding amounts to \$6,688,605. Therefore the holders would have the option of subscribing to an amount equal to nearly 50 per cent. of their present holdings at 50. The stock pays dividends of 5 per cent. A controlling interest in the road—that is, \$3,385,000 of stock—is owned by the Louisville & Nashville. The company has notified the treasury department that it is prepared to take up \$500,000 of its bonds held by the Government. During the war the Government took possession of the road and at its conclusion turned the road back to its stockholders, receiving \$1,000,000 in bonds for improvements. Half of the bonds have previously been redeemed.

New York Central & Hudson River.—The gross earnings for May, 1891, were \$3,474,437, as compared with gross earnings of \$3,128,094 in May, 1890, an increase of \$346,343. The 1891 figures include \$288,191 earnings of the Rome, Watertown & Ogdensburg road.

New York, Providence & Boston.—The officers explain that the \$4,000,000 of new four per cent. bonds recently authorized by the Rhode Island Legislature will be expended as follows: \$1,300,000 to be held to secure the present bonded debt; \$500,000 for new stock in the Providence & Stonington Steamship Co., to be issued for two new steamers now under contract; about \$500,000 to retire floating debt; the balance, \$1,700,000, to be held in the treasury for future requirements.

Norfolk & Western.—The officers state that under the recent offering of preferred stock to the shareholders 25,000 of the new shares have been taken, netting the company about \$1,250,000, an amount sufficient for the company's present requirements. The whole amount of the new series offered for subscription was 85,000 shares.

Northern Pacific.—The gross earnings of the road for May, 1891, were \$2,285,774, and for May, 1890, \$2,417,266, a decrease of \$131,492.

Ohio & Northwestern.—The bondholders of the company have practically agreed upon the acceptance of a plan for reorganization which has been prepared by their special committee. The committee found prior claims outstanding to the amount of \$583,616. There are 1,120 bonds of \$1,000 each included in the reorganization, and to retire the prior claims it will be necessary to assess each bond \$530. There are 124 bonds outside. The plan proposes \$584,000 preferred stock at \$5,500 per mile, and \$1,556,000 common stock at \$14,500 per mile. Present bondholders subscribe for the preferred stock at par, and the proceeds will be used to retire the prior debt. The common stock will be used to retire the mortgage bonds and past due coupons.

St. Louis & San Francisco.—Judge Thayer, of the United States Court, in St. Louis, has denied the application of the first preferred stockholders of the company for an injunction restraining the Atchison, Topeka & Santa Fe from owning stock of the road and issuing a \$50,000,000 blanket mortgage. The main point relied upon by the plaintiffs to sustain their application was that the Atchison, being a competing line, could not, under the statutes of Missouri, own stock belonging to a competitor. Judge Thayer held that the roads were not competitors.

The stockholders of the company, at their adjourned meeting at St. Louis, June 9, authorized the issue of \$50,000,000 of new four per cent. bonds to take the place of the six and seven per cent. outstanding bonds, which will be retired at maturity. Out of a total of 200,000 shares of stock, 242,132 shares were represented at the meeting. Of this amount 222,921 shares were voted in favor of the new financial scheme.

St. Paul & Duluth.—The Minnesota Railroad Commissioners have decided the suit of the citizens of Hinckley, Minn., against the Nettle River Railroad Company, ordering to resume the operations of the line from Sandstone junction to Sandstone, five miles, within 30 days. The St. Paul & Duluth owns the line.

San Antonio & Aransas Pass.—Judge King, of the District Court of Texas, has authorized the receivers to issue negotiable certificates amounting to \$350,000 and bearing six per cent. interest, for finishing the Waco branch of the road. The extension has been completed from Yoakum on the main line north to Lexington, Tex., 86 miles, and for some miles south of Waco, to near Lott; but there is a gap of about 55 miles on which the track has not been laid.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, June 10, 1891.

Chairman Midgley, of the Western Freight Association, has issued a notice that is calculated to put a stop to the manipulation of rates on packing-house productions from Western points to the seaboard by the allowance of excessive divisions by way of Illinois junctions. The maintenance of an arrangement whereby the Indiana, Illinois & Iowa was allowed a percentage of the revenue accruing east of the Missouri River to a Chicago rate point has proved constantly troublesome, and Mr. Midgley has therefore given notice to the interested lines that the arrangement must, on and after June 15, be discontinued, and the division allowed intermediate and connecting lines restricted to a percentage of the revenue accruing between the Mississippi River and points in Trunk Line territory. This applies to both east and west bound traffic.

Lake and rail rates were restored to-day to the basis agreed upon for the season prior to the opening of navigation; but it is intimated that so many future contracts have been made at the low rates that the advance will be more apparent than real. Some wheat has gone to Buffalo at one cent a bushel.

The Central Traffic Association has reconsidered the action taken at the May meeting in regard to rates to be charged on exhibits for the World's Fair, and adopted the following rule to govern:

"All exhibits to be charged at full tariff rates, plus switching charges when going to the Exposition; but if returned exhibits are tendered to the railroad by which they were carried to Chicago . . . the property will

be returned free to the points within the Central Traffic Association at which they were originally received."

The Illinois Central is not satisfied with Chairman Finley's ruling, by which a fine was imposed on that company for failure to advance passenger rates from St. Louis to Chicago, May 17, as ordered, and has appealed to arbitration. It contends that it was justified in failing to advance the rates, as the Chicago & Alton had announced that it would refuse to do so, and it would have been useless to advance the rates and reduce them again on the same day. The Alton simply pursues a waiting policy. It has not appealed and has not paid the fine.

Traffic Notes.

The officers of the St. Louis Traffic Association are: President, L. B. Tebbetts; Secretary, George H. Morgan; Treasurer, D. C. Ball.

The Jacksonville Southeastern road, which has been doing most of its St. Louis freight business over the Merchants' Bridge, has made a contract with the old bridge for six months. The passenger trains have always gone via the latter.

A convention of claim agents at St. Paul has agreed upon a scheme of interstate reciprocal relations whereby claims against a railroad company, when made by a citizen of a state through which the road does not run, may, if litigated, be sued in the state where the claim originated.

Commissioner Goddard has decided that the differential rates by the West Shore-Canadian Pacific line shall be: Class 1, 3 cents per 100 lbs.; class 2, 2 cents; class 3, 1 cent; class 4, 1 cent; class 5, $\frac{1}{2}$ cent; class 6, 1 cent above the rates via the New York, Ontario & Western-Canadian Pacific route, these being the same differentials existing as between these lines on Chicago traffic.

Some coal dealers of Denver, having complained because they were charged demurrage after 48 hours on bulk freight, were told by Superintendent Hill in his reply that on the 300,000 tons of coal received at Denver since January the average demurrage paid was less than $\frac{1}{2}$ cent a ton, and that no single dealer averaged more than 2 cents per ton paid for demurrage.

The Passenger Committee of the Trunk Line Association is considering the question of dividing all first and second-class business destined to points beyond the western gateways of the association. Each company has been asked to suggest what percentage it wants, and what proportions it would allow the others. The total of what the general passenger agents want, as shown by the first exhibit of "claims," is said to have been about 169 per cent. The matter was referred to the Commissioner for adjustment.

The Kansas City grain dealers will withdraw their complaint against the Santa Fe, Rock Island, Missouri Pacific and Union Pacific roads, filed some time ago before the Interstate Commerce Commission. The cause of the withdrawal is not stated, but the surmise is that a compromise has been effected. It is known that certain concessions have been made by some of the roads, which, it is claimed, reduce the alleged discrimination against Kansas City to a minimum. It is said that the Rock Island has agreed to prorrate at Kansas City.

It is said that the Custom House officials at Suspension Bridge have discovered a scheme whereby Chinese are successfully smuggled into this country from Canada without fear of detection. A Chinese boss at Toronto is the leader. He receives the Chinese from Vancouver, and tickets them through to New York, sending them in sleeping car berths on the train which passes Suspension Bridge at 3 o'clock in the morning. Only those who are too poor to buy sleeping-car tickets are liable to be caught. But it appears that Me Ching and Paw Wee have been caught by Deputy Crocker.

The Pennsylvania has put on a new through train between New York and Chicago, leaving New York at 4 p. m. and Chicago at 10:45 a. m. Westbound the train will be called the Chicago Special and will run through in 20 $\frac{1}{2}$ hours. Eastbound it is the "Keystone Express," and the running time will be the same. The new 20-hour train between Boston and Chicago, over the Boston & Albany, New York Central and Lake Shore, takes the place of existing trains for most of the way. The Southwestern Limited, which has heretofore left New York at noon, now starts at 11:30 and joins the Boston train at Albany. The evening train out of New York for Cincinnati and St. Louis has been divided, and a fast train now starts at 8 p. m. One of the fast eastern trains from Cincinnati, over the Big Four, now runs one via Columbus.

Party Rates on the Lake Shore & Michigan Southern.

Parties of ten or more, traveling together, will be charged two cents per mile per capita each way for the round trip; 50 or more, one fare for round trip; 100 or more, $\frac{1}{4}$ cents per mile each way; 200 or more, one cent per mile each way. Tickets going must be limited to day of sale, but returning may be limited to not more than five days, including date of sale.

East-Bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, June 6, amounted to 43,389 tons, against 34,840 tons during the preceding week, a decrease of 8,549 tons. The proportions carried by each road were:

	Wk. to June 6.		Wk. to May 30.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	4,960	11.5	3,948	6.1
Wabash.....	2,176	5.0	2,112	11.3
Lake Shore & Michigan South.	7,224	16.7	6,229	17.7
Pitts., Ft. Wayne & Chicago.	5,138	11.9	4,606	13.7
Chicago, St. Louis & Pitts.....	6,031	13.9	4,861	13.9
Baltimore & Ohio.....	3,667	8.5	2,450	7.0
Chicago & Grand Trunk.....	3,610	8.3	2,482	7.1
New York, Chic. & St. Louis.....	3,902	9.0	3,339	9.5
Chicago & Atlantic.....	6,681	15.2	4,792	13.7
Total.....	43,389	100.0	34,840	100.0

Of the above shipments 3,091 tons were flour, 11,587 tons grain, 2,520 tons millstuff, 4,473 tons cured meats, 7,687 tons dressed beef, 2,177 tons butter, 1,277 tons hides, and 7,578 tons lumber. The three Vanderbilt lines together carried 37.2 per cent., while the two Pennsylvania lines carried but 25.3.

During the preceding week Decoration Day deprived the roads of one day's business. The bulk of the grain went by way of the lakelines, which secured 82,851 tons, while the rail lines carried but 11,587 tons.